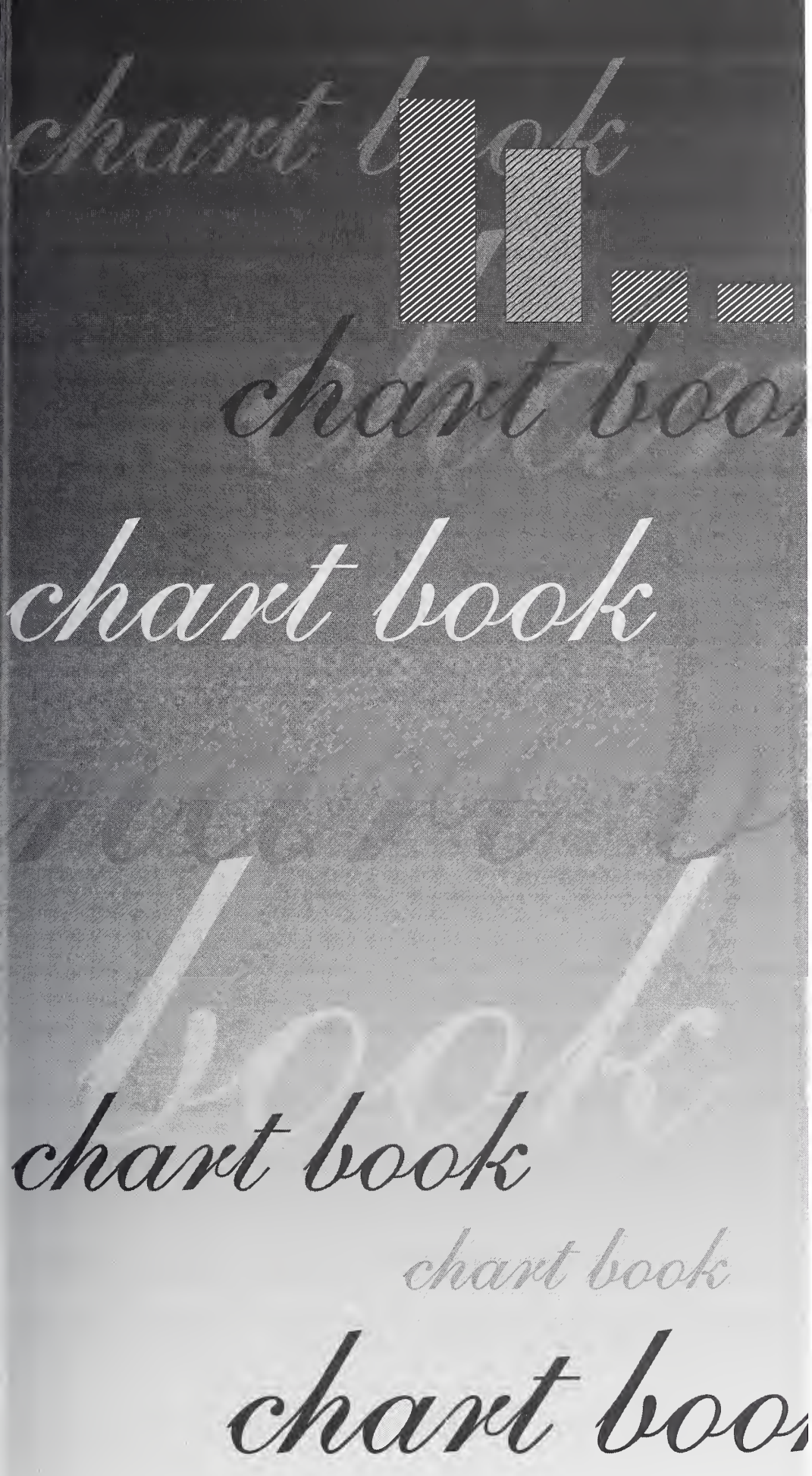
Morbidity & Mortality: 2002 Chart Book on Cardiovascular, Lung, and Blood Diseases

NATIONAL INSTITUTES OF HEALTH
NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

The bar graph on the front cover depicts the four leading causes of death in 2000: HEART DISEASE, cancer, STROKE, and COPD and Allied Conditions.



Morbidity & Mortality: 2002 Chart Book on Cardiovascular, Lung, and Blood Diseases

May 2002

For Administrative Use

National Institutes of Health

National Heart, Lung, and Blood Institute

Foreword

The mission of the National Heart, Lung, and Blood Institute (NHLBI) is to provide leadership and support for research in cardiovascular, lung, and blood diseases; sleep disorders; women's health; and blood resources. The ultimate goal is to improve the health and well-being of the American people. Although program priorities are determined primarily by research opportunities, other factors have an influence: the magnitude, distribution, and trends of cardiovascular, lung, and blood diseases in the United States, as well as the ability to improve the Nation's health; congressional mandates; the health needs of the Nation as perceived by Institute staff and outside advisory groups; and recommendations from the National Heart, Lung, and Blood Advisory Council, have a significant impact on establishing research priorities.

Evaluation of the Institute's program balance and program impact is a continuous process that relies on assessments of morbidity and mortality in the United States from cardiovascular, lung, and blood diseases. Consideration is given to their distribution among the population; to their trends over time; and to related statistics on population risk factors, lifestyles, medical care, and economic impact.

This *Chart Book*, like its predecessors, provides information on the progress being made in the fight against cardiovascular, lung, and blood diseases. It serves as a resource for the Institute as it plans and prioritizes future activities.

I would like to express my appreciation to Mr. Thomas Thom of the NHLBI for his time and effort in developing the material presented in this *Chart Book*.

Claude Lenfant, M.D.
Director
National Heart, Lung, and Blood Institute

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1. Introduction

During the past 35 years, major advances have been made in the prevention, diagnosis, and treatment of cardiovascular, lung, and blood diseases. Death rates from cardiovascular diseases (CVD) have declined significantly and Americans are living longer, healthier lives. Yet, despite the tremendous progress that has been made, morbidity and mortality from cardiovascular, lung, and blood diseases contribute to the immense burden on patients, their families, and the national health care system; the economic cost to the Nation is substantial.

This *Chart Book* describes the magnitude of the problem and provides time trends for these diseases, highlighting demographic differences—age, sex, and minority/ethnic status. Data are presented by race and ethnicity to the extent they are available, statistically reliable, and consistently collected within a study. Morbidity and mortality statistics are given for cardiovascular, lung, and blood diseases in the United States as well as for States and selected countries.

The "Background Data" chapter provides population and life-expectancy estimates, trends in total mortality, leading causes of death, prevalence of CVD risk factors, and economic cost data. The "Cardiovascular Diseases," "Lung Diseases," and "Blood Diseases" chapters contain detailed morbidity and mortality statistics by race/ethnic group, sex, and geographic distribution. Diseases included under the three headings are listed in the first table in each chapter together with appropriate diagnostic codes of the 9th and 10th revisions of the International Classification of Diseases (ICD) of the World Health Organization (WHO).[1–2]

Sources of Data

Most of the data used in this book were obtained from the National Center for Health Statistics (NCHS): specifically, the annual vital statistics of the United States; the annual National Health Interview Survey (NHIS); the National Health and Nutrition Examination Survey (NHANES), 1971–75, 1976–80, and 1988–94; the National Health Examination Survey, 1960–62; the annual National Hospital Discharge Survey; and the annual National Ambulatory Medical Care Survey. International mortality data came from the World Health Organization (WHO) Web site.

It is beyond the scope of the *Chart Book* to cite all of the NCHS and Bureau of the Census publications, data tapes, and Web sites that were used. Specific data sources for current statistics and general references to hospital and prevalence surveys and vital statistics for earlier data years may be found in the "References" appendix.

Population Estimates

The NCHS and the NHLBI used annual mid-year U.S. population estimates from the Bureau of the Census to express morbidity and mortality per population. Prevalence and hospital discharge statistics were based on noninstitutionalized population estimates that were included in NCHS data sources. The annual live births were reported by NCHS and used for infant mortality rates.

Quality of Data

Quality issues discussed below include accuracy of diagnosis, data comparability, ICD classification, and sampling error.

The criteria of the source study determine the diagnosis for estimates of incidence. For disease prevalence and smoking habits, diagnosis is based on self reports from health interviews. Physical measurements are used to determine the prevalence of high serum cholesterol and overweight. Prevalence of hypertension is based on blood pressure readings and health interviews about medication. For hospital, mortality, and economic cost statistics, diagnosis is accepted as listed on medical records, death certificates, or survey forms. Those diagnoses are consistent with ICD codes, the 9th revision (1979–98) or the 10th revision for mortality only (1999–).[1–2]

Hospital Statistics

Hospitalization rates are a useful measure of health care use. National hospitalization and hospital case-fatality statistics, however, have limitations associated with diagnostic accuracy (e.g., the diagnosis may be influenced by the billing process) and diagnostic comparability over time (e.g., ICD revisions). Time trends may not accurately reflect real changes in occurrence and case-fatality because the data occasionally include changes in hospital admission practices. Nevertheless, diagnoses obtained from hospital records have been accepted as reported.

The term *hospitalizations* as used here is synonymous with the National Hospital Discharge Survey term *hospital discharges* and refers to all patients, whether discharged alive or dead. The diagnosis given at discharge, and not at admission, is used. Most tabulations of hospitalizations are first-listed diagnoses on the hospital record, i.e., primary diagnosis. Some tabulations are of the "all-listed" diagnoses that include both primary and secondary diagnoses for a particular disease. Because the survey is event-based rather than patient-based, annual estimates pertain to numbers of hospitalizations, not to the number of patients hospitalized in a given year.

Methodological problems in data collection preclude the presentation of hospital data by race.[3]

Cause-of-Death Statistics

Limitations of cause-of-death statistics, apart from discontinuities over time caused by revisions in the ICD, are well known. Inaccuracies in death certification and inconsistencies in selecting and coding the underlying cause of death create uncertainties as to the true magnitude of mortality from a specific cause compared with other causes. These uncertainties also must be kept in mind when comparing the same cause of death over time or the same cause of death between demographic groups or countries. Selecting only one cause of death as the underlying cause has the advantage of diagnostic specificity, but the disadvantage of an incomplete accounting of the various causes that contributed to the death. Because of the complexity of basing mortality statistics on tabulations of both the underlying and contributing (secondary) causes of death, most data are for the underlying causes.

Another limitation related to cause-of-death statistics concerns cross-national comparisons of vital statistics. Comparisons of mortality data for coronary heart disease (CHD), stroke, chronic obstructive pulmonary disease (COPD), and asthma among countries are affected by differences in diagnostic practices and physician training, interpretation of internationally recommended rules for coding a cause of death, availability of diagnostic aids, and the use of autopsies. Information presented in this book is limited to countries that are known to produce high-quality statistics.

ICD Revisions

Revisions in the ICD (Appendix A) have affected the comparability of time trends, particularly those associated with mortality. Breaks between revisions are shown on charts where comparability is a concern.

Codes from the 10th revision were used to determine diagnoses for mortality beginning in 1999.[2] To compensate for the differences in mortality classification between ICD/10 and ICD/9, the NCHS derived the comparability ratios shown in Appendix B.[4] They have been applied to 1999 and 2000 death rates to make them comparable to rates coded from 1979 to 1998. For this reason, the 1999 and 2000 death rates in certain charts are under the ICD/9 heading even though ICD/10 began in 1999.

Coding rules and practices are not universal, so differences that affect comparability of cause-specific morbidity and mortality exist in diagnosis coding by countries, States, and demographic groups.

Data Presentation

Death rates are expressed per 100,000 population using the resident population as of July 1 of the relevant year as the denominator. Prevalence, on the other hand, is expressed as the percent of the population. Hospital discharge rates are per 10,000 population, and the percent discharged dead has numbers of discharges as the denominator. Infant mortality rates are expressed per 100,000 live births.

Age Adjustment Rates

Age-adjusted U.S. death rates are based on the 2000 age-adjustment standard, i.e., the distribution, in 10-year age groups, of the U.S. population in 2000.[5–7] This standard is also used to summarize the age-specific prevalence for diseases and risk factors based on NHANES data. The European standard population is used for age adjustment for international mortality statistics.[8]

Age-adjusted rates are used to compare prevalence or mortality of two or more population groups or the Nation as a whole over time. The 2000 standard population is used so that these rates are unaffected by differences in the age composition of the populations being compared.

The major disadvantage of using age-adjusted rates is loss of age-specific information. This becomes evident when the population groups being compared have mortality differences that are not in the same direction over a given age range. For example, the bars in Chart 3–65 for diseases of arteries mortality show that white males have a higher age-adjusted rate than black males, but the lines in Chart 3–66 show that the rates for white males are higher only at the oldest ages.

Percent Change

Percent changes in death rates over time are calculated from log-linear regression slopes of the annual rates.[9] They may be influenced by unusually high or low values, especially if the period is short. They do not provide information about the levels on which they are based, which might be small. Average annual percent changes should not be summed over a period because the sum will be more than the percent change from the first to the last year in the period. Average annual percent changes give the appearance of small differences in the comparisons being made. An exception to the use of log-linear regression to calculate percent change is made for Chart 3–6. For this table, it is useful to have the percent change and other calculations based on the actual death rates.

Horizontal and Vertical Scales

Comparisons between time-trend charts are complicated because ranges of the horizontal and vertical scales are not uniform and may be truncated. Vertical scales for less common diagnoses are magnified to focus on age, race, and sex differences.

Arithmetic and Logarithmic Scales

In this *Chart Book*, most time trends in death rates were plotted on an arithmetic Y-scale to show their absolute change relative to zero. Note, however, that on an arithmetic scale, the absolute increase or decrease for a smaller death rate can be modest compared with the change for a larger death rate, yet the percent change over time will be greater for the smaller rate. In addition, on an arithmetic scale, a decline can be slowing whereas the rate of decline, if plotted on a logarithmic scale, may not be slowing. Where particularly appropriate, these differences are discussed in the text.

Truncated Age Ranges

The age range for death rates in some charts excludes groups older than 84 years because of the difficulty associated with obtaining accurate diagnose for patients who often have other contributing comorbidities. Selected truncated age groups are frequently used for U.S. data to highlight specific premature adult morbidity and mortality. For international comparisons, the age range 35–74 years was chosen so that differing age distributions among countries would be minimized in rate calculations.

Demographic Characteristics

The *Chart Book* provides prevalence and mortality information for various racial and ethnic groups. Several charts show comparisons between blacks and whites. Occasionally, data for nonwhites instead of blacks are presented. While many charts provide a race/sex comparison, others present data for total males and total females or for total whites and total blacks to highlight important points that otherwise would be lost if four-way combinations were used.

The term *American Indian* is used to refer to the population that consists of American Indians and Alaska Natives. The term *Asian* is used to include the population that consists of Asians and Pacific Islanders. Data on socioeconomic groups are not presented because they are extensively presented elsewhere.[10]

State Mortality

Death rates for total population by State are shown for CVD, CHD, stroke, and COPD.[11] Although State maps that combine all age, race, and sex groups can be misleading, the ones included in this book show a reasonably similar geographic pattern compared with maps that are either race and sex specific or confined to a specific age range (not shown). This is true even for stroke mortality, in which high rates in the Southern States are not due merely to the large black population. Although rankings of certain States for CHD mortality differ markedly from rankings for total heart disease, the two geographic patterns are not too different.[12]

2. Background Data

The charts in this chapter provide population estimates, life expectancy, morbidity and mortality information, and economic cost data for cardiovascular, lung, and blood diseases. Most of them focus on the leading causes of death, but a few show prevalence of specific CVD risk factors. Immediately below are prevalence and incidence estimates for selected cardiovascular, lung, and blood diseases.

Cardiovascular Diseases

Table 2–1 contains prevalence estimates for the U.S. population with CVD. Individuals with multiple CVD are counted for each condition that applies to them.[13–15]

Table 2–1. CVD Prevalence, U.S.

CVD	61,800,000
Hypertension	50,000,000
CHD	12,600,000
Acute Myocardial Infarction (AMI)	7,500,000
Angina Pectoris	6,400,000
Stroke	4,600,000
Heart Failure	4,800,000
Congenital Heart Defects	1,000,000
Atrial Fibrillation	2,000,000

Table 2–2 provides estimates for the annual occurrence of CVD in the United States.[16–19]

Table 2–2. CVD Incidence and Recurrence, U.S.

Heart Attack	1,100,000
First Event	650,000
Recurrent Event	450,000
Stroke	600,000
First Event	500,000
Recurrent Event	100,000
Heart Failure	550,000
First Event	550,000

Lung Diseases

In 2000, 11.4 million U.S. adults were estimated to have COPD, i.e., chronic bronchitis (9.4 million) or emphysema (3.1 million).[20] Approximately 11 million people experienced at least one asthma attack in 2000.[20] According to NHLBI estimates, about 30,000 people have cystic fibrosis, and 2,500 new cases are reported annually. Respiratory distress syndrome occurs in 40,000 infants and 150,000 adults each year.

In this chapter, charts showing leading causes of death classify asthma with COPD and list the category as "COPD and allied conditions." The ICD/10 term is "chronic lower respiratory diseases."

Blood Diseases

Approximately 3.5 million people have some form of anemia.[15] The NHLBI estimated that 72,000 blacks—1 of 500 black births—have sickle cell anemia, 20,000 persons have hemophilia, and 1,000 persons have Cooley's anemia.

Background Data

Chart 2–1
Total Population by Mean Age, Percent Age 65+, Race/Ethnicity, and Sex, U.S., 2002

The mean age and percent population ages 65 and older are lower for minorities in the United States than the mean age and percent ages 65 and older are for whites. This holds true for both males and females.[21]

	Total Population			Male			Female		
	Pop. (Mil.)	Mean Age	Percent 65+	Pop. (Mil.)	Mean Age	Percent 65+	Pop. (Mil.)	Mean Age	Percent 65+
Total	280.3	36.2	12.6	137.0	35.5	10.8	143.3	38.0	14.3
White	229.5	37.7	13.6	112.8	36.4	11.6	116.7	38.9	15.5
Hispanic	(31.7)	(29.3)	(6.2)	(15.9)	(28.5)	(5.2)	(7.9)	(30.1)	(13.5)
Non-Hispanic	(197.8)	(39.0)	(14.8)	(96.9)	(37.7)	(12.6)	(100.9)	(40.3)	(16.8)
Black	36.2	32.7	8.3	17.2	31.2	6.9	19.0	34.0	9.6
Hispanic	(1.9)	(29.4)	(5.7)	(1.0)	(28.6)	(4.7)	(1.0)	30.2	(6.6)
Non-Hispanic	(34.3)	(32.9)	(8.5)	(16.2)	(31.3)	(7.1)	(18.0)	(34.2)	(9.7)
American Indian	2.5	31.0	7.1	1.2	30.2	6.0	1.3	31.8	8.0
Asian	12.0	33.2	7.8	5.8	32.2	6.9	6.3	34.2	8.7
Hispanic*	34.8	29.3	6.1	17.4	28.5	5.1	17.3	30.1	7.1

* Hispanic can be of any race.

Note: Estimates of numbers of Hispanic American Indians and Hispanic Asians are not provided separately.

Chart 2–2
Total Population by Mean Age, Percent Age 65+, Race/Ethnicity, and Sex, U.S., 2020

The mean age and percent population ages 65 and older of minorities, projected to 2020, in the United States will still be lower than the mean age and percent ages 65 and older for whites. The same will be true for males and females. The population size for all groups, ages 65 and older, is projected to increase.[5, 21]

	Total Population			Male			Female		
	Pop. (Mil.)	Mean Age	Percent 65+	Pop. (Mil.)	Mean Age	Percent 65+	Pop. (Mil.)	Mean Age	Percent 65+
Total	324.9	39.2	16.5	158.9	38.0	14.8	166.1	40.3	18.2
White	257.4	40.0	17.8	126.7	38.9	16.0	130.7	41.2	19.5
Hispanic	(50.3)	(31.9)	(8.6)	(25.1)	(31.0)	(7.5)	(25.2)	(32.7)	(6.2)
Non-Hispanic	(207.1)	(42.0)	(20.0)	(101.6)	(40.8)	(18.1)	(105.5)	(43.2)	(21.8)
Black	44.7	36.1	12.0	21.3	34.5	10.3	23.4	37.5	13.6
Hispanic	(3.2)	(32.6)	(9.2)	(1.5)	(31.5)	(8.3)	(1.6)	(33.4)	(10.0)
Non-Hispanic	(41.5)	(36.4)	(12.3)	(19.8)	(34.8)	(10.5)	(21.8)	(37.8)	(13.8)
American Indian	3.2	33.9	10.3	1.6	33.0	8.8	1.6	34.7	11.8
Asian	19.6	36.0	11.5	9.2	34.7	10.4	10.3	37.1	12.5
Hispanic*	55.2	31.9	8.7	27.4	31.0	7.5	27.7	32.7	9.8

* Hispanic can be of any race.

Note: Estimates of numbers of Hispanic American Indians and Hispanic Asians are not provided separately.

Chart 2–3
Average Remaining Lifetime Years by Age, Race, and Sex, U.S., 1999

In 1999, average life expectancy at birth was 76.7 years—79.4 years for females compared with 73.9 for males and 77.3 years for whites compared with 71.4 years for blacks.[22]

Year	Total	Male	Female	Total White	White Male	White Female	Total Black	Black Male	Black Female
Birth	76.7	73.9	79.4	77.3	74.6	79.9	71.4	67.8	74.7
15	62.5	59.7	65.1	63.0	60.3	65.5	57.8	54.3	61.0
35	43.5	41.0	45.7	43.9	41.5	46.1	39.3	36.3	41.9
65	17.7	16.0	19.1	17.8	16.1	19.2	16.0	14.3	17.3
75	11.2	9.9	12.1	11.2	10.0	12.1	10.4	9.2	11.1

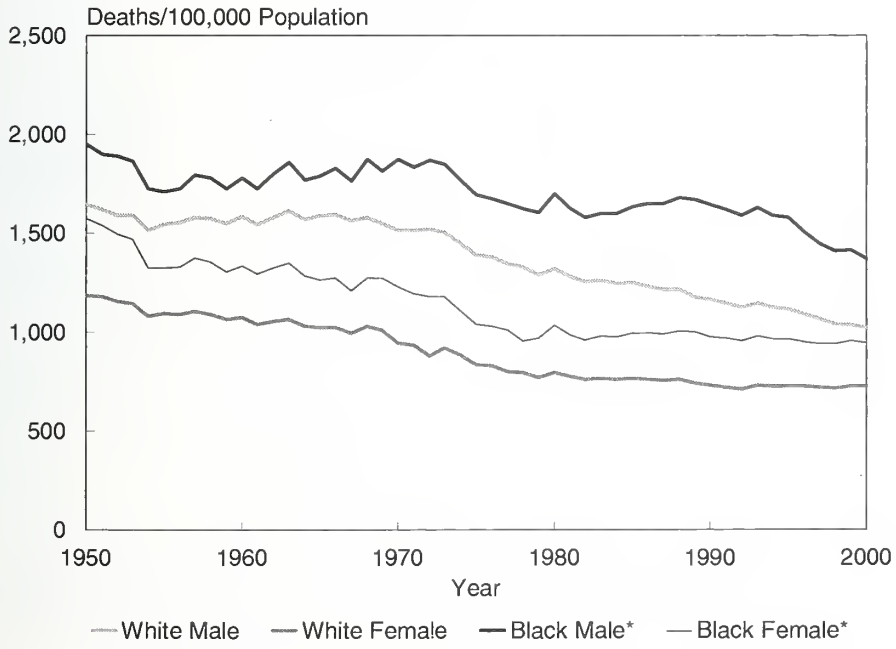
Background Data

Chart 2–4
Leading Chronic Conditions Causing Limitation of Activity, U.S., 2000

Chronic Condition	Persons (Millions)
Arthritis	5.9
Back/neck conditions	5.2
Heart condition	4.4
Injury	3.7
Hypertension	3.0
Diabetes	2.8
Lung condition	2.6
Mental condition	2.5
Vision condition	2.1
Stroke	1.6
Musculoskeletal condition	1.3
Cancer	1.3
Hearing condition	1.2

In 2000, heart disease was the third leading chronic condition causing activity limitation. Hypertension, lung condition, and stroke were also common.[20]

Chart 2–5
Age-Adjusted Death Rates for All Causes by Race and Sex, U.S., 1950–2000



* Nonwhite from 1950–1967.

Between 1950 and 2000, the all-cause death rate declined for blacks and whites and for males and females. It remained higher in males than in females. Within sex groups, the rate was higher in blacks than in whites.[11, 22–26]

Background Data

Chart 2–6
Crude Death Rates for Selected Causes, U.S., 1950–2000

Among the leading causes of death, lung cancer and COPD, and to a lesser extent other cancers, increased as CHD and stroke mortality deceased. Although the rates of decline for CHD and stroke were similar, the absolute decline was greater for CHD than for stroke.[11, 22–25]

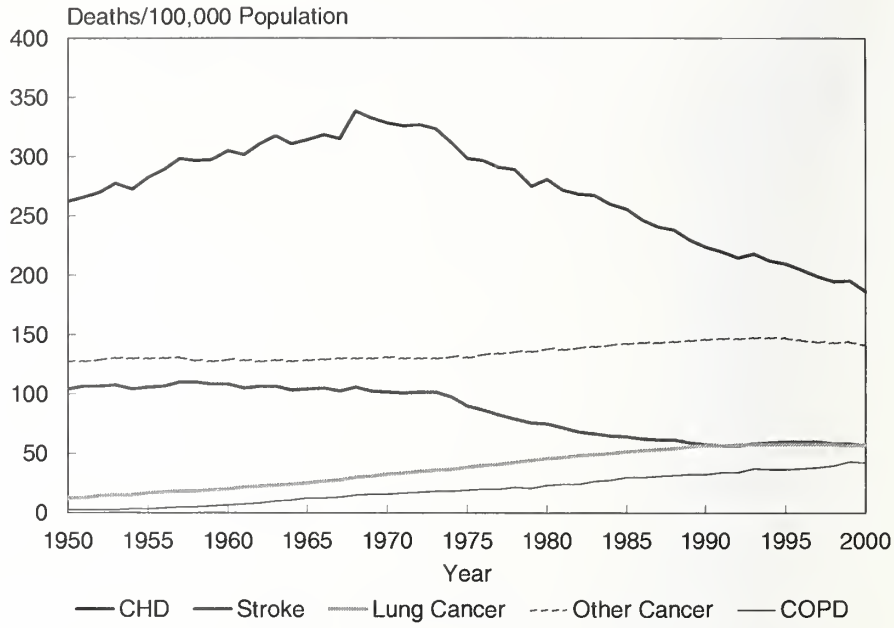
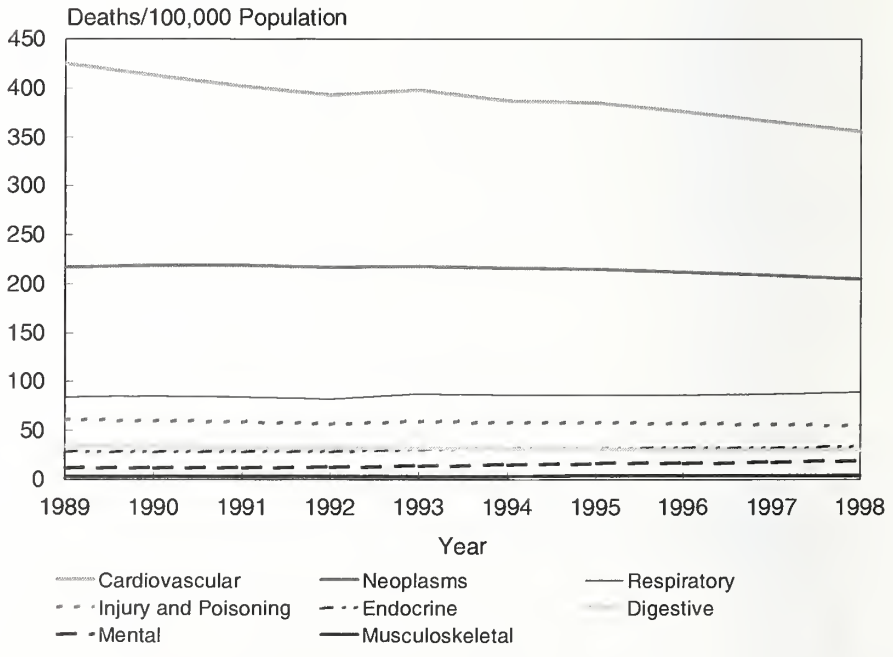


Chart 2–7
Age-Adjusted Death Rates by Major Diagnosis, U.S., 1989–1998

Between 1989 and 1998, age-adjusted death rates for cardiovascular and respiratory diseases ranked first and third, respectively.[11]



Background Data

Chart 2–8
Leading Causes of Death, U.S., 2000

Cause of Death		Number
Total		2,404,624
1	Heart disease*	709,894
2	Cancer	551,833
3	Cerebrovascular disease (stroke)	166,028
4	COPD and allied conditions†	123,550
5	Accidents	93,592
6	Diabetes	68,662
7	Influenza and pneumonia	67,024
8	Alzheimer's disease	49,044
9	Nephritis	37,672
10	Septicemia	31,613
All other causes of death		505,712

* Includes 529,659 deaths from coronary heart disease.

† Chronic lower respiratory diseases.

In 2000, heart disease, stroke, and COPD and allied conditions were the first, third, and fourth leading causes of death, respectively.[24]

Chart 2–9
Leading Causes of Death by Age and Rank, U.S., 2000

Cause of Death	1–24	25–44	45–64	65–84	85+
Heart disease	5	3	2	1	1
Cancer	4	2	1	2	2
Cerebrovascular disease	9	8	4	3	3
Accidents	1	1	3	9	9
COPD and allied conditions*	8	—	5	4	6
Influenza and pneumonia	7	10	—	6	4
Diabetes mellitus	—	9	6	5	7
Suicide	3	4	8	—	—
Chronic liver disease	—	7	7	—	—
Nephritis and nephrosis	—	—	10	8	8
Homicide	2	6	—	—	—
Septicemia	—	—	—	10	10
HIV infection	10	5	9	—	—
Congenital anomalies	6	—	—	—	—
Alzheimer's disease	—	—	—	7	5

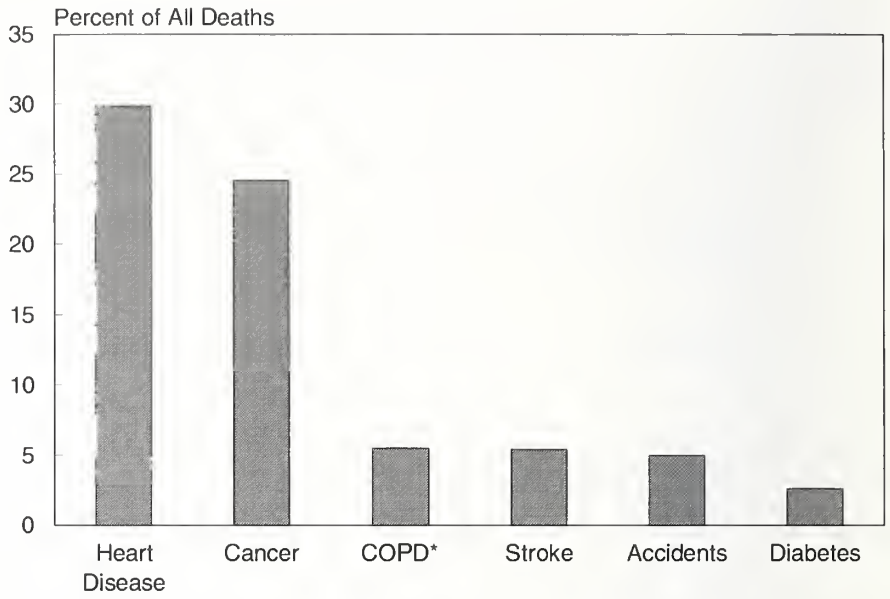
* Chronic lower respiratory diseases.

In 2000, heart disease was the third leading cause of death for those ages 25–44, second for those ages 45–64, and first for those ages 65 and older. Stroke ranked fourth for those ages 45–64 and third for those ages 65 and older. COPD and allied conditions ranked fourth for those ages 65–84 and fifth for those ages 45–64.[24, 26]

Background Data

Chart 2–10
Leading Causes of Death,
White Males, U.S., 2000

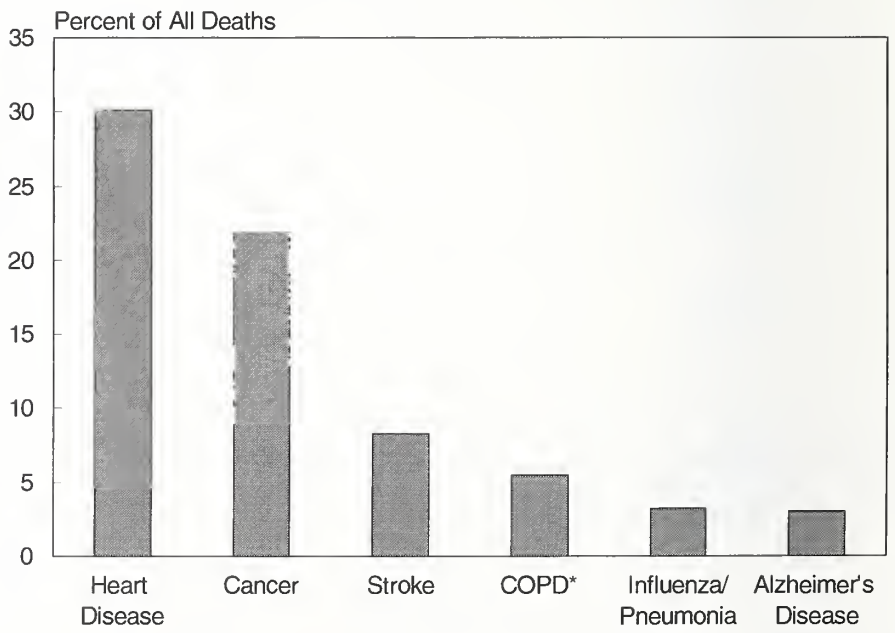
In 2000, heart disease, COPD and allied conditions, and stroke were the first, third, and fifth leading causes of death among white males, respectively.[26]



* COPD and allied conditions.

Chart 2–11
Leading Causes of Death,
White Females, U.S., 2000

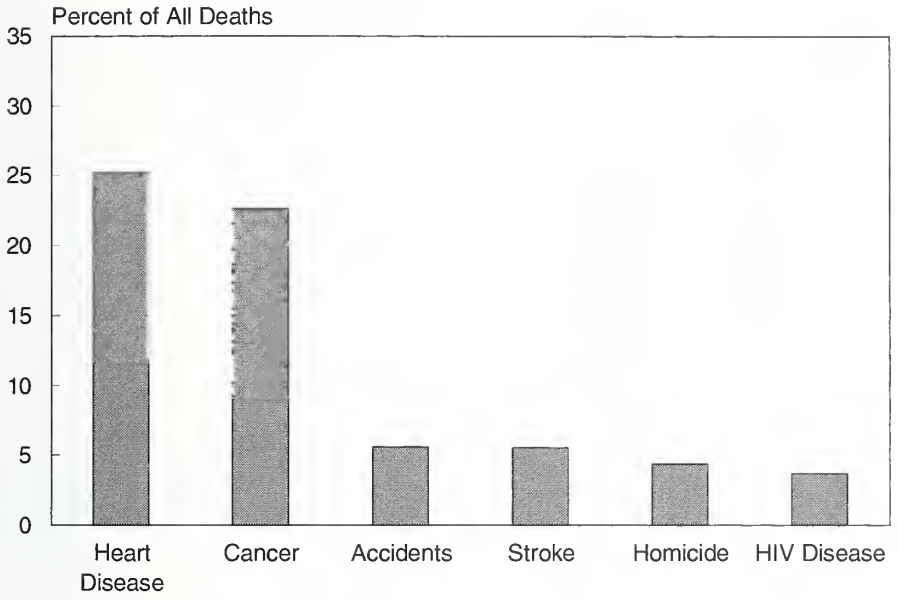
In 2000, heart disease, stroke, and COPD and allied conditions were the first, third, and fourth leading causes of death among white females, respectively.[26]



* COPD and allied conditions.

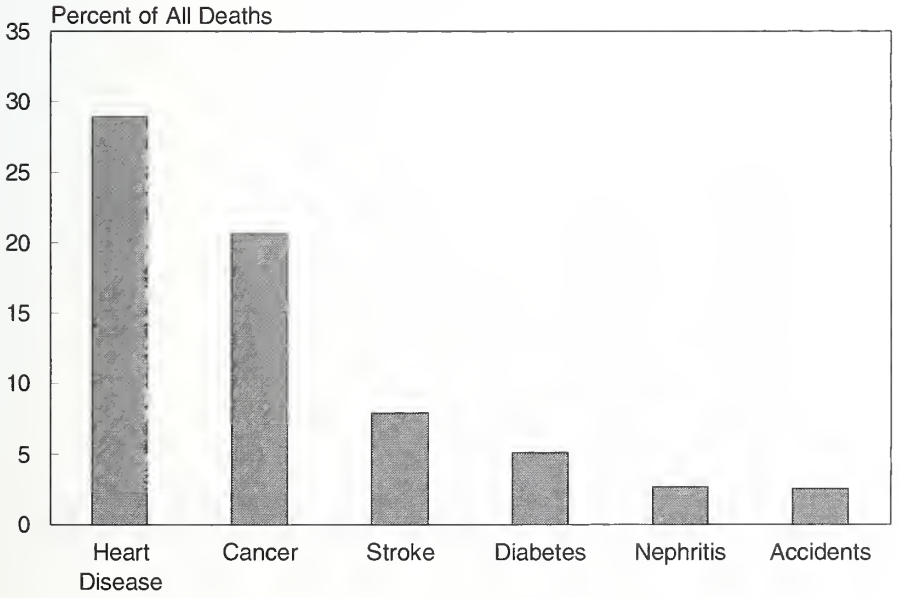
Background Data

Chart 2–12
Leading Causes of Death,
Black Males, U.S., 2000



In 2000, heart disease and stroke were the first and fourth leading causes of death among black males, respectively.[26]

Chart 2–13
Leading Causes of Death,
Black Females, U.S., 2000

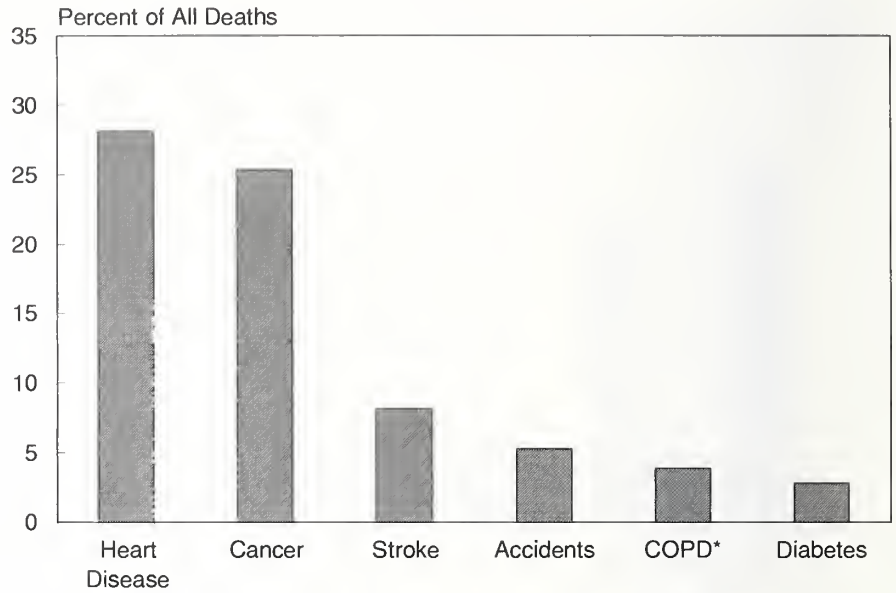


In 2000, heart disease and stroke were the first and third leading causes of death among black females, respectively.[26]

Background Data

Chart 2–14
Leading Causes of Death,
Asian Males, U.S., 1999

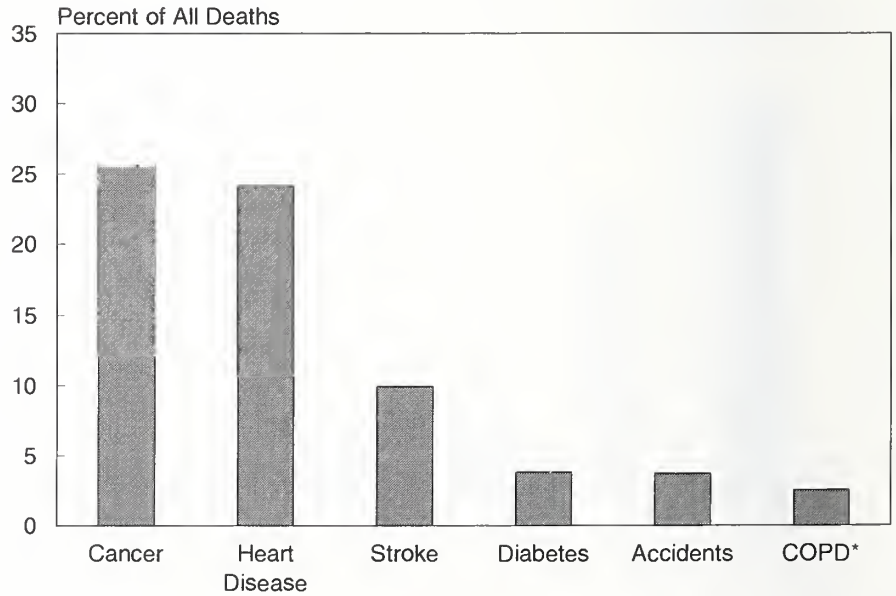
In 1999, heart disease, stroke, and COPD and allied conditions were the first, third, and fifth leading causes of death among Asian males, respectively.[27]



* COPD and allied conditions.

Chart 2–15
Leading Causes of Death,
Asian Females, U.S., 1999

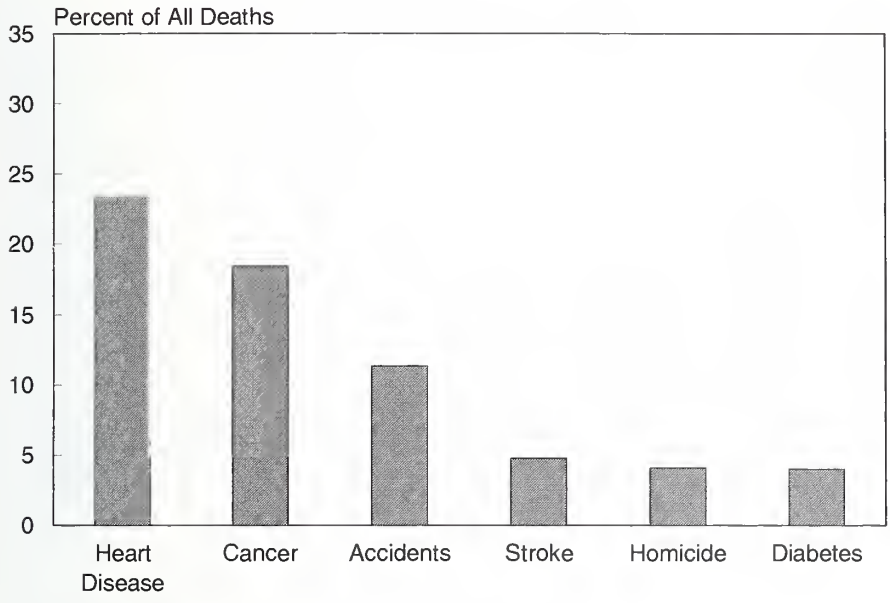
In 1999, heart disease, stroke, and COPD and allied conditions were the second, third, and sixth leading causes of death among Asian females, respectively.[27]



* COPD and allied conditions.

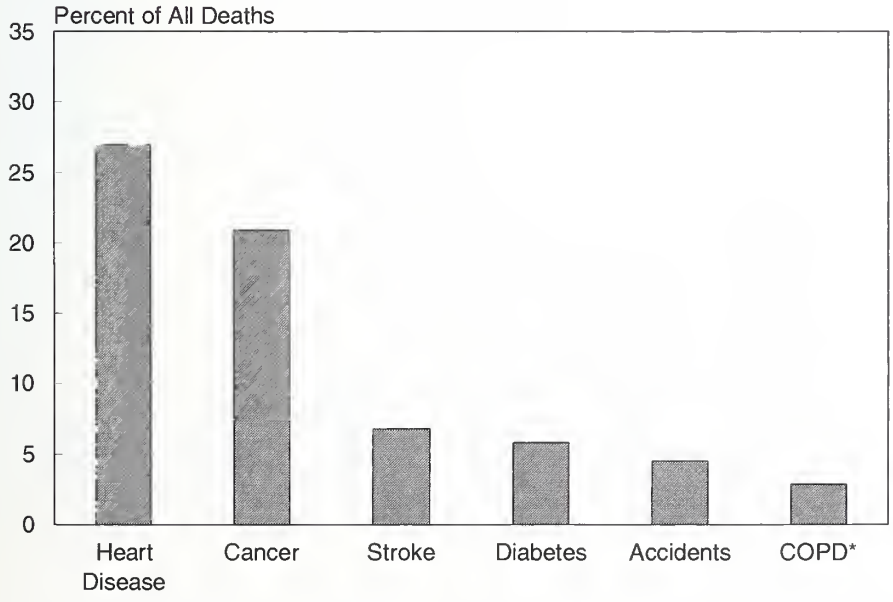
Background Data

Chart 2–16
Leading Causes of Death,
Hispanic Males, U.S., 1999



In 1999, heart disease and stroke were the first and fourth leading causes of death among Hispanic males, respectively.[27]

Chart 2–17
Leading Causes of Death,
Hispanic Females, U.S., 1999



In 1999, heart disease, stroke, and COPD and allied conditions were the first, third, and sixth leading causes of death among Hispanic females, respectively.[27]

* COPD and allied conditions.

Background Data

Chart 2–18
Leading Causes of Death,
American Indian Males, U.S., 1999

In 1999, heart disease and stroke were the first and sixth leading causes of death among American Indian males, respectively.[27]

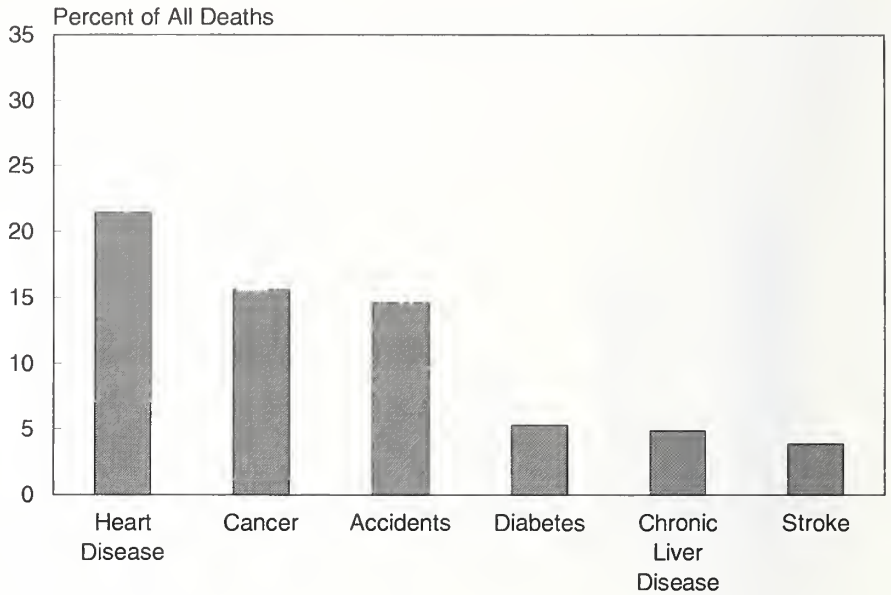
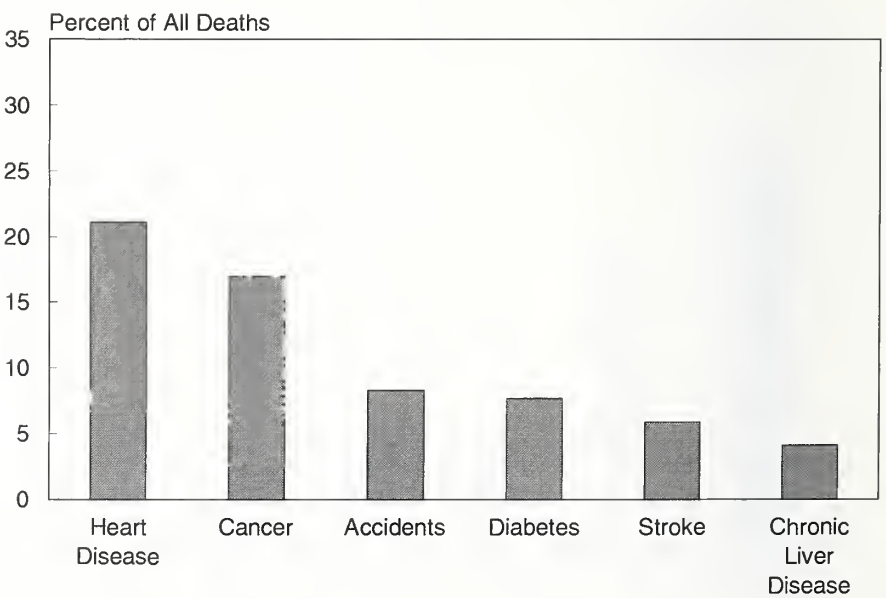


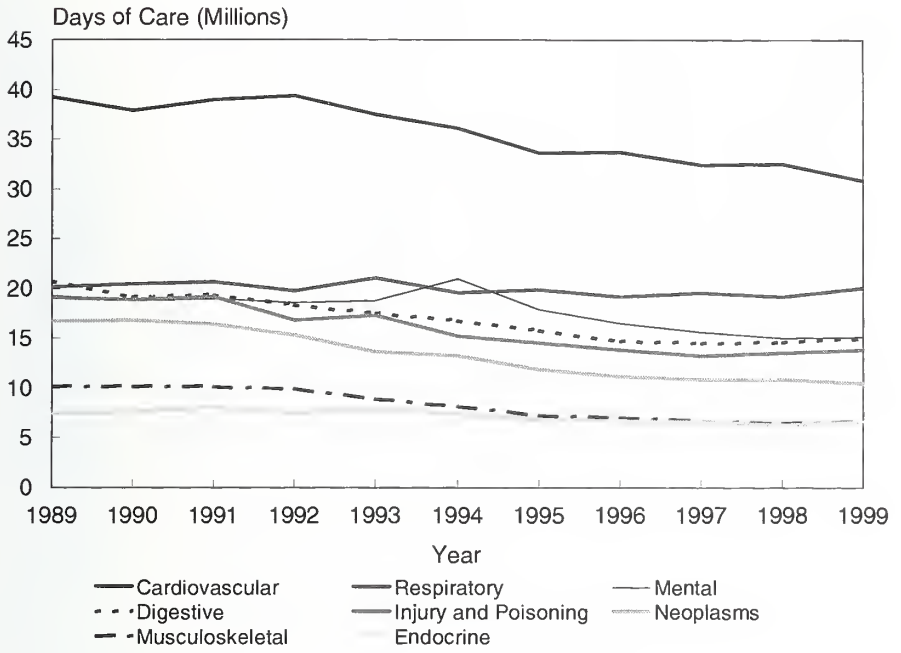
Chart 2–19
Leading Causes of Death,
American Indian Females, U.S., 1999

In 1999, heart disease and stroke were the first and fifth leading causes of death among American Indian females, respectively.[27]



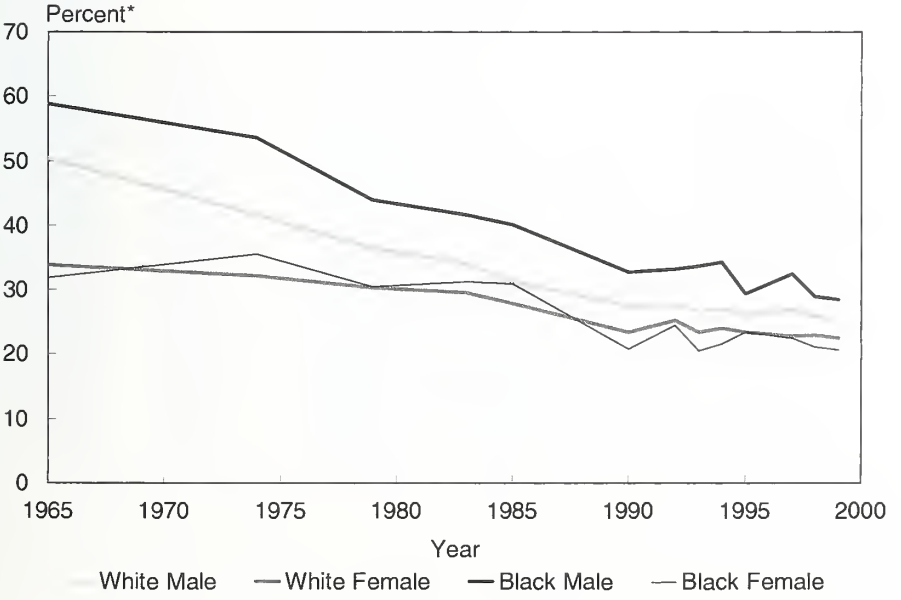
Background Data

Chart 2–20
Number of Days of Inpatient Hospital Care by Major Diagnosis, U.S., 1989–1999



Between 1989 and 1999, cardiovascular and respiratory diseases ranked first and second, respectively, in the number of days for which inpatients received hospital care.[28–29]

Chart 2–21
Percent of Population Currently Smoking by Race and Sex, Age 18+, U.S., 1965–1999

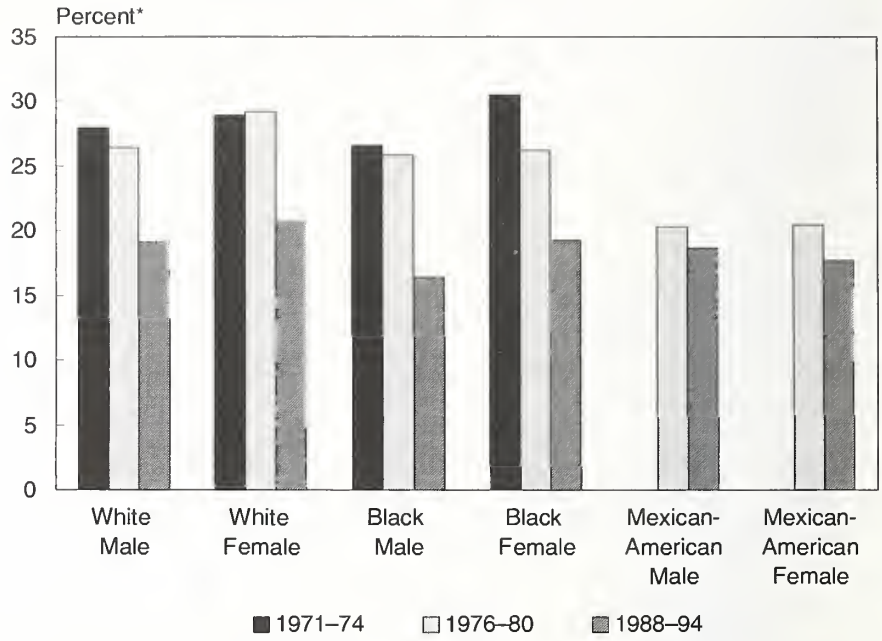


Between 1965 and 1990, the percent of the population, ages 18 and over, who smoked cigarettes decreased significantly. During the 1990s, the percent of the population who smoked remained relatively stable.[27]

* Age adjusted.

Prevalence of high total serum cholesterol declined in white and black males and females between 1971–74 and 1988–94; between 1976–80 and 1988–94, it also declined in Mexican-American males and females.[27]

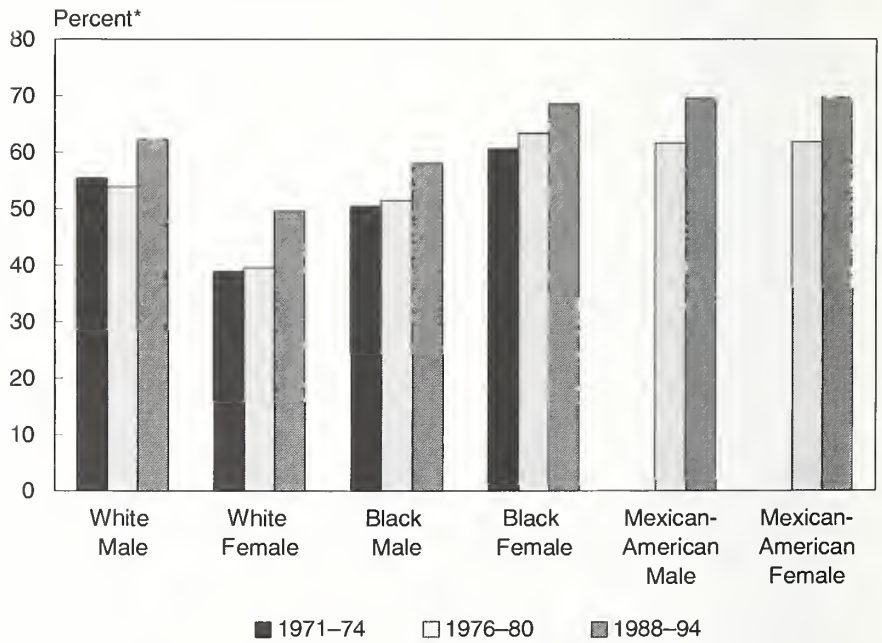
Chart 2–22
Percent of Population With High Serum Cholesterol by Race and Sex, Ages 20–74+, U.S., 1971–74 and 1988–94



* Age adjusted.
Note: High serum cholesterol is 240+ mg/dL.

For each race-sex group, the prevalence of overweight males and females increased between 1976–80 and 1988–94.[27]

Chart 2–23
Percent of Population That Is Overweight, by Race and Sex, Ages 20–74, U.S., 1971–74 and 1988–94



* Age adjusted.
Note: Overweight is a body mass index of 25 kg/m2.

Chart 2–24
Economic Cost in Billions of Dollars of Cardiovascular, Lung, and Blood Diseases, U.S., 2002

Disease	Total	Direct	Morbidity	Mortality
Total CVD	329.2	199.5	30.9	98.8
Heart disease	214.0	115.0	19.0	80.0
Coronary	111.8	58.2	8.4	45.2
Congestive Heart Failure	23.2	21.4	*	1.8
Stroke	49.4	30.8	5.6	13.0
Hypertensive disease	47.2	34.4	6.7	6.1
Selected lung diseases	115.9	65.4	23.8	26.7
COPD	32.1	18.0	6.8	7.3
Asthma	14.0	9.4	2.7	1.9
Selected blood disease	9.7	7.1	0.7	1.9
Anemias	6.4	4.9	0.6	0.9

* No estimate available.

Annual expenditure for health and lost productivity due to cardiovascular, lung, and blood diseases cost the Nation billions of dollars. Costs for these diseases as secondary causes of morbidity and mortality were not included.[25, 30–38]

Chart 2–25
Direct Cost in Billions of Dollars of Cardiovascular, Lung, and Blood Diseases, U.S., 2002

Disease	Total	Hospital Care	Physicians Services*	Prescription Drugs	Home Heath Care	Nursing Home Care
Total CVD	199.5	88.6	29.9	31.8	11.7	37.5
Heart disease	115.0	62.8	15.3	13.5	5.2	18.2
Coronary	58.2	32.2	8.6	6.2	1.6	9.6
CHF	21.4	11.9	1.6	2.0	2.4	3.5
Stroke	30.8	12.0	2.4	0.8	3.1	12.6
Hypertensive disease	34.4	4.8	8.6	15.5	1.7	3.7
Selected lung diseases	65.4	38.8	9.9	11.1	2.2	3.4
COPD	18.0	7.3	3.4	3.7	0.8	2.7
Asthma	9.4	3.1	2.6	3.7	†	†
Selected blood diseases	7.1	3.5	1.6	0.5	0.8	0.8
Anemias	4.9	2.2	1.1	0.4	0.5	0.7

* Physicians, clinics, and other professional services.

† No estimate available.

Among the direct cost (health expenditures) for cardiovascular, lung, and blood diseases (except stroke), hospital care ranked highest. For stroke, the expenditure for nursing home care was slightly higher than the cost of hospital care.[30–34, 37]

3. Cardiovascular Diseases

The diagnostic group *cardiovascular diseases* as used here includes diseases and congenital anomalies of the circulatory system as coded in the ICD.

Charts 3–1 through 3–3 show the distribution in 1999 of CVD deaths, heart disease deaths, and stroke deaths, respectively. Chart 3–4 contains a list of CVD; their 9th revision ICD codes; 1999 estimates of hospital discharges, length of stay, and physician office visits for the diagnostic codes; 10th revision ICD codes for the CVD; and number of deaths in 1999 for those codes. Subsequent charts display morbidity and mortality for total CVD, total heart disease, and selected subgroups.

Coronary Heart Disease

AMI and other CHD account for almost 75 percent of all heart disease deaths (Chart 3–2). Identifying CHD as the underlying cause of death, however, is sometimes difficult because the diagnostic information available at the time of death can be insufficient to distinguish accurately among the various forms of heart disease. This applies to AMI and angina pectoris—two conditions included under the CHD category. Although their classifications may be of limited use in identifying general mortality, it is useful for hospitalization and office visit statistics and for prevalence.

Over the years, multiple revisions of the ICD have led to changes in the codes for CHD. These revisions complicate the determination of mortality trends because subgroups within the categories change. The category CHD, in the ICD/10, was expanded to include "Atherosclerotic CVD." Therefore, CHD death rates prior to ICD/10 coding (1999) were tabulated to include the additional term to ensure uniformity in classification of CHD mortality from 1950 to 2000. As a result, these CHD death rates are higher than those in previous issues of the *Chart Book*.

Congestive Heart Failure

CHF is a sequela of various heart diseases. It is a heart "condition," not a heart "disease," and is more common as a contributing rather than an underlying cause of death. Thus, it is imprecise to classify CHF as an underlying cause of death. The condition, however, is increasingly prevalent and common in hospitalizations and mortality reporting. In fact, hospitalizations and mortality for CHF have increased (until very recently), while mortality for total heart diseases has declined.

Cardiomyopathy

In 1999, more than 27,000 deaths were attributed to cardiomyopathy even though no consensus exists on classification and diagnostic criteria for the disease. It is assumed that this limitation has little effect on any mortality differences influenced by age, race, or sex.

Atrial Fibrillation and Other Heart Diseases

The number of patients hospitalized with atrial fibrillation has been increasing, but the number of deaths caused by it is uncertain because the diagnostic information on the death certificate is inadequate. Diseases of pulmonary circulation, acute and subacute endocarditis, and cardiac dysrhythmias are additional heart diseases of interest. Because measures of their morbidity, and especially their mortality are of uncertain quality, no charts pertaining to them have been included.

Hypertensive Disease

Prevalence and trend data on awareness, treatment, and control of hypertension are important statistics associated with hypertension morbidity and have therefore been included in this chapter. Mortality statistics for hypertensive disease are not described because it is not a distinct underlying cause of death. In fact, its presence on death certificates is often arbitrary, and its selection as the underlying cause of death is often characterized by a lack of good diagnostic information at the time of death.

Cerebrovascular Diseases (Stroke)

Cerebrovascular disease, i.e., stroke, is the third leading cause of death. Only a small proportion of deaths from stroke can be classified as cerebral hemorrhage, occlusion, thrombosis, or embolism. Most are coded to unspecified forms of cerebrovascular disease (Chart 3–3). Thus, mortality for the entire category is presented in charts related to stroke.

Diseases of Arteries

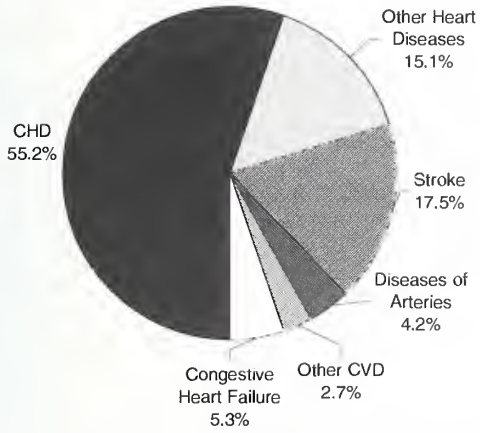
The ICD term "diseases of arteries" is used to refer to peripheral vascular disease and includes a variety of atherosclerotic disorders; none of them specifically involve the heart or brain. Examples are aortic aneurysm, atherosclerosis of the extremities, arterial embolism and thrombosis, and generalized atherosclerosis. Mortality data are presented, but valid prevalence estimates are unavailable.

Congenital Anomalies of the Circulatory System

The ICD term "congenital anomalies of the circulatory system" includes congenital heart disease. Because most deaths in this category occur in infants younger than 1 year of age, the preferred mortality tabulation is the infant mortality rate.

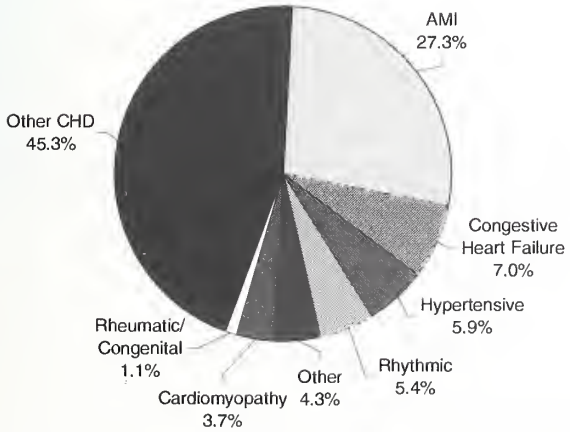
Cardiovascular Diseases

Chart 3–1
Cardiovascular Disease Deaths, Percent by Subgroup, U.S., 1999



Total Deaths = 958,775 (100%), including congenital CVD, ICD/10 codes Q20–Q28.

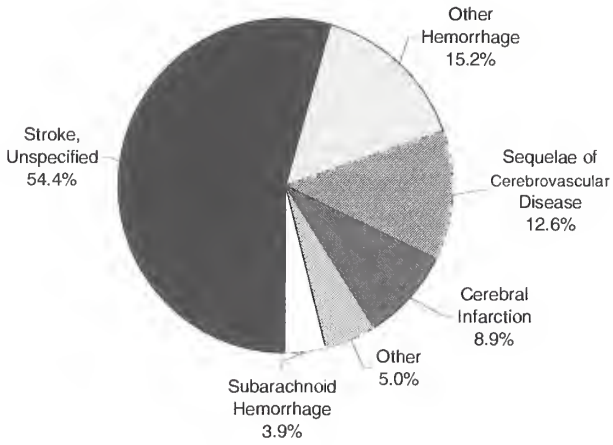
Chart 3–2
Heart Disease Deaths, Percent by Subgroup, U.S., 1999



Total Deaths = 729,628 (100%), including congenital heart disease, ICD/10 codes Q20–Q24.

Chart 3–3
Stroke Deaths, Percent by Subgroup, U.S., 1999

Total Deaths = 167,366 (100%)



Cardiovascular Diseases

Chart 3–4
Number of Hospitalizations, Physician Office Visits, and Deaths for Cardiovascular Diseases, U.S. 1999

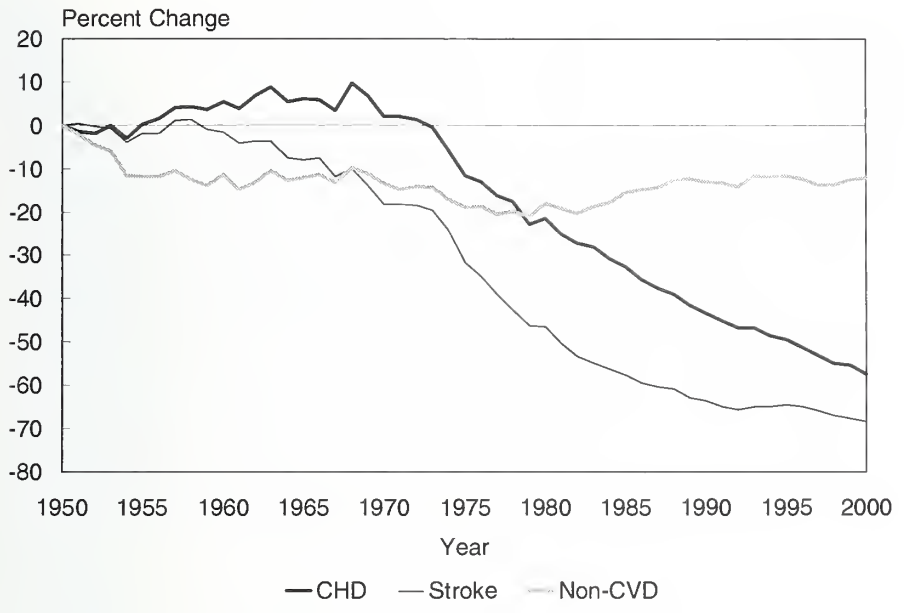
		Hospitalizations				
Diagnostic Category	ICD/9 Codes	First-Listed Discharge (1,000)	Length of Stay (Days)	Physician Office Visits (1,000)	ICD/10 Codes	Deaths
Total	390–459, 745–747	6,398	4.9	60,425	I00–I99, Q20–Q28	958,775
Heart disease	390–398, 402, 404–429	4,465	4.7	19,252	I00–I09,I11,I13,I20–I51	725,192
Rheumatic heart disease	390–398	42	7.0	196	I00–I09	3,676
Hypertensive heart disease	402, 404	127	5.2	550	I11, I13	26,029
Coronary heart disease:	410–414, 429.2	2,262	4.4	10,070	I20–I25	529,659
AMI	410	829	5.6	133	I21, I22	199,454
Angina pectoris	413	82	2.5	910	I20	503
Atherosclerotic CVD	429.2	8	4.1	512	I25.0	71,926
Other CHD	411, 412, 414	1,351	3.8	8,515	Other I23–I25	257,776
Diseases of pulmonary circulation	415–417	106	7.1	107	I26–I28	13,244
Pulmonary embolism	415.1	90	7.5	92	I26	9,008
Other	415.0, 415.2–417	13	5.7	15	I27 – I28	4,236
Subacute bacterial endocarditis	421	14	12.5	0	I33.0	1,088
Cardiomyopathy	425	35	5.7	513	I42	27,260
Atrial fibrillation and flutter	427.3	384	3.6	2,312	I48	8,338
Other arrythmic disorders	Other 427	310	3.6	1,311	Other I43–I49	31,638
Heart failure	428	975	5.5	2,684	I50	54,913
Congestive heart failure	428.0	962	5.5	2,618	I50.0	50,824
Left heart failure and unspecified	428.1– 428.9	13	3.3	66	O50.1.9	4,089
Other heart disease	Other 420–429	191	5.3	1,508	Other I30–I52	29,347
Other hypertensive disease	401, 403	312	3.3	32,172	I10–I12	16,968
Cerebrovascular diseases	430–438	961	5.4	2,409	I60–I69	167,366
Diseases of arteries:	440–448	286	6.8	1,993	I70–I79	40,788
Atherosclerosis	440	120	6.4	222	I70	14,979
Aortic aneurysm	441	63	8.6	141	I71	15,807
Other diseases of arteries	442–448	102	6.1	1,630	I72–I78	10,002
Deep vein thrombosis	451.1	13	6.7	0	I80.2	1,727
Other and unspecified CVD	Other 451–459	297	5.2	4,138	Other I80–I99	2,298
Congenital malformations of CV system	745–747	54	8.5	461	Q20–Q28	4,436
Congenital heart disease	475–746	38	9.5	375	Q20–Q24	3,551
Other congenital CVD	747	16	6.1	86	Q25–Q28	885

Note: Estimates of hospitalizations and physician office visits are subject to sampling variability. Estimates of hospitalizations below 50,000 have a relative standard error of more than 11 percent. Estimates of physician office visits below 588,000 have a relative standard error of more than 30 percent.

Compiled from references 11, 25, 28, and 32.

Cardiovascular Diseases

Chart 3–5
Change in Age-Adjusted Death Rates Since 1950, U.S., 1950–2000



The CHD death rate increased 10 percent from 1950 to its peak in 1968; by 2000, it was 58 percent lower than it was in 1950. Stroke mortality, on the other hand, declined for most of those years and by 2000 was 68 percent lower than it was in 1950. By comparison, the death rate for noncardiovascular causes decreased only 12 percent since 1950.[11, 22–26]

Chart 3–6
Age-Adjusted Death Rates and Percent Change for All Causes and Cardiovascular Diseases, U.S., 1970 and 2000

Cause of Death	Deaths/100,000 Pop. 1970	2000	1970–2000 Difference	Percent Change
All causes	1,222.6	872.4	-350.2	-28.6
CVD*	698.9	341.0	-357.9	-51.2
CHD	448.0	186.6	-261.4	-58.3
CHF	8.3	19.1	10.8	130.1
Stroke	147.7	56.8	-90.9	-61.5
Other CVD	94.9	78.5	-16.4	-17.3
Non-CVD	523.7	531.4	7.7	1.5

* Excludes congenital anomalies of the circulatory system.

Between 1970 and 2000, the CVD death rate declined 51 percent compared with 2 percent for all non-CVD causes of death. CHD and stroke mortality declined 58 percent and 62 percent, respectively. CHF, however, more than doubled.[11, 22–26]

Cardiovascular Diseases

Chart 3–7
Average Annual Percent Change in Age-Adjusted Death Rates for All Causes and Cardiovascular Diseases, U.S., 1965–2000

CVD mortality declines continued. The latest average annual percent declines were 2.3 percent for CVD, 3.3 percent for CHD, and 2.4 percent for stroke.[11, 22–26]

Period	All Causes	Total CVD*	CHD	Stroke	Other CVD	All Other Causes
1965–1970	-1.1	-1.9	-1.1	-2.2	-3.4	-0.1
1970–1975	-2.0	-2.7	-2.7	-3.2	-2.2	-1.2
1975–1980	-1.4	-2.4	-2.5	-5.2	-0.1	-0.1
1980–1985	-0.9	-2.4	-3.0	-4.4	0.1	0.6
1985–1990	-1.0	-2.9	-3.4	-3.0	-2.2	0.8
1990–1995	-0.3	-1.3	-2.3	-0.3	-0.1	0.5
1995–2000	-1.0	-2.3	-3.3	-2.4	-0.1	-0.1

* Excludes congenital anomalies of the circulatory system.

Chart 3–8
Average Annual Percent Change in Age-Adjusted Death Rates for All Causes and Cardiovascular Diseases by Race and Sex, U.S., 1990–2000

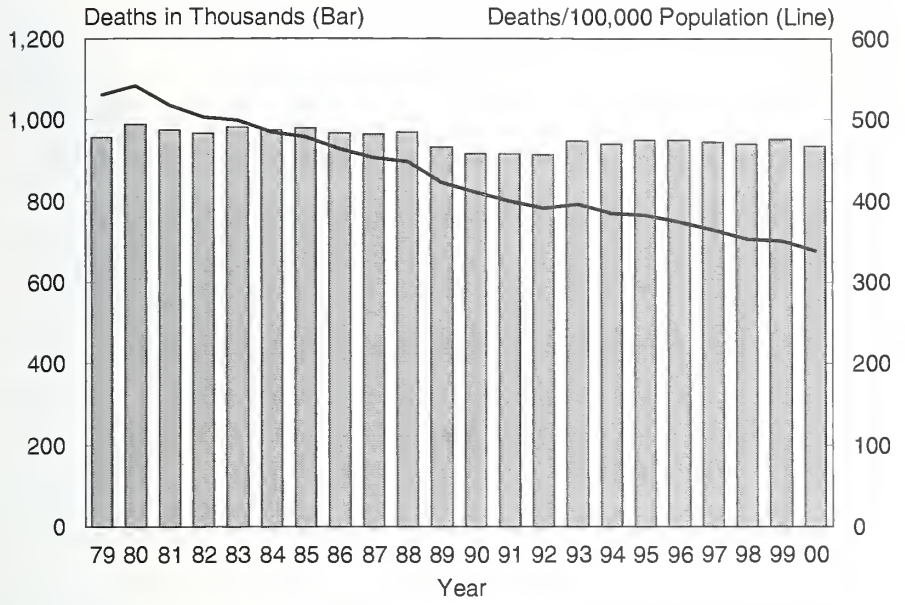
Between 1990 and 2000, declines in CVD, CHD, and stroke mortality were greater in males than in females. By sex, declines in CVD and CHD were greater for whites than blacks, while the decline in stroke was greater for blacks than whites.[11, 22–26]

Cause of Death	Total	White Male	White Female	Black Male	Black Female
All causes	-0.7	-1.3	–	-2.0	-0.4
CVD	-1.8	-2.4	-1.4	-2.2	-1.2
Heart disease	-2.0	-2.5	-1.6	-2.4	-1.5
Coronary	-2.8	-3.2	-2.6	-2.6	-1.8
CHF*	+1.4	+1.0	+2.0	+0.1	+0.7
Stroke	-1.1	-1.5	-0.7	-2.2	-1.3
Non-CVD	+0.1	-0.6	+1.0	-1.8	+0.3

* 1990–1999.

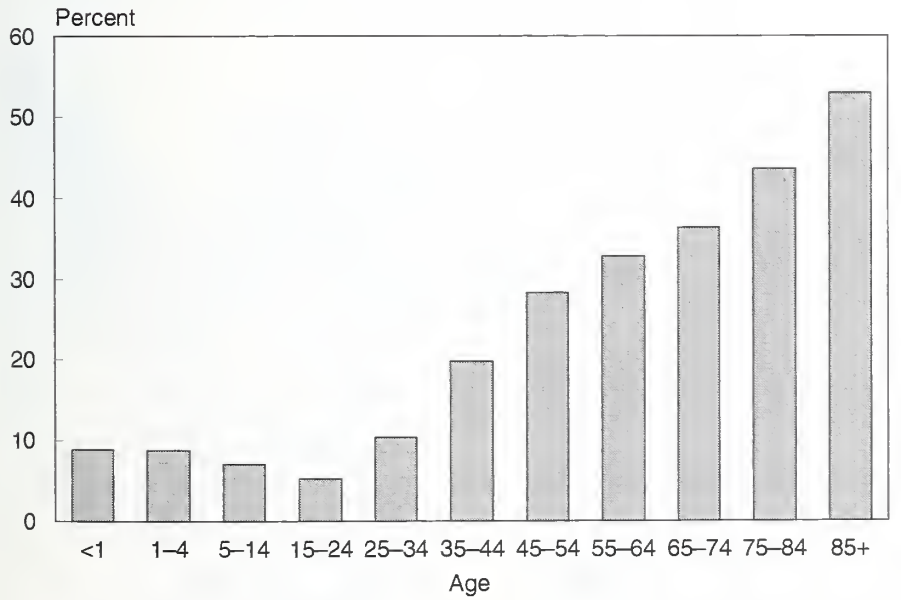
Cardiovascular Diseases

Chart 3–9
Deaths and Age-Adjusted Death Rates for Major Cardiovascular Diseases, U.S., 1979–2000



Age-adjusted CVD death rates declined considerably between 1979 and 2000, despite only a very modest decline in the total number of CVD deaths.[11, 22, 24]

Chart 3–10
Percent of All Deaths Due to Cardiovascular Diseases* by Age, U.S., 1999



The percent of deaths due to CVD increased with age among adults. In 1999, it was 20 percent at ages 35–44 and 53 percent at ages 85 and older.[11]

* Includes congenital CVD.

Cardiovascular Diseases

Chart 3–11
Age-Adjusted Death Rates for Cardiovascular Diseases by State, U.S., 1996–98

In 1996–98, CVD mortality was higher in the East than in the West.[11]

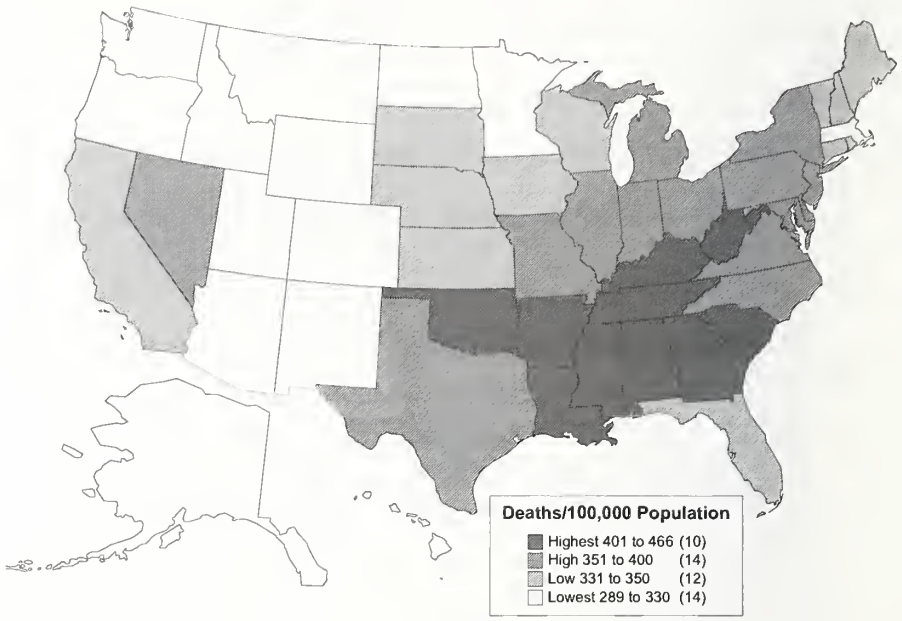
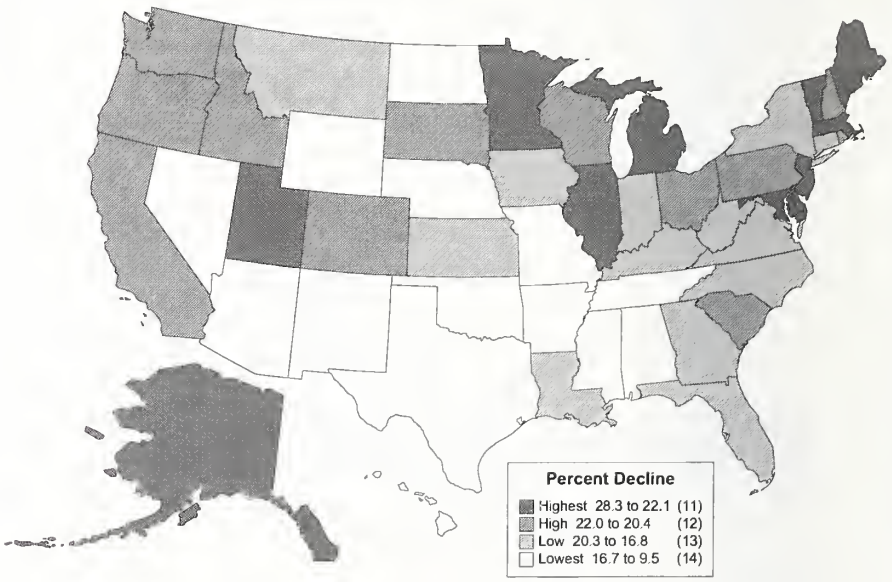


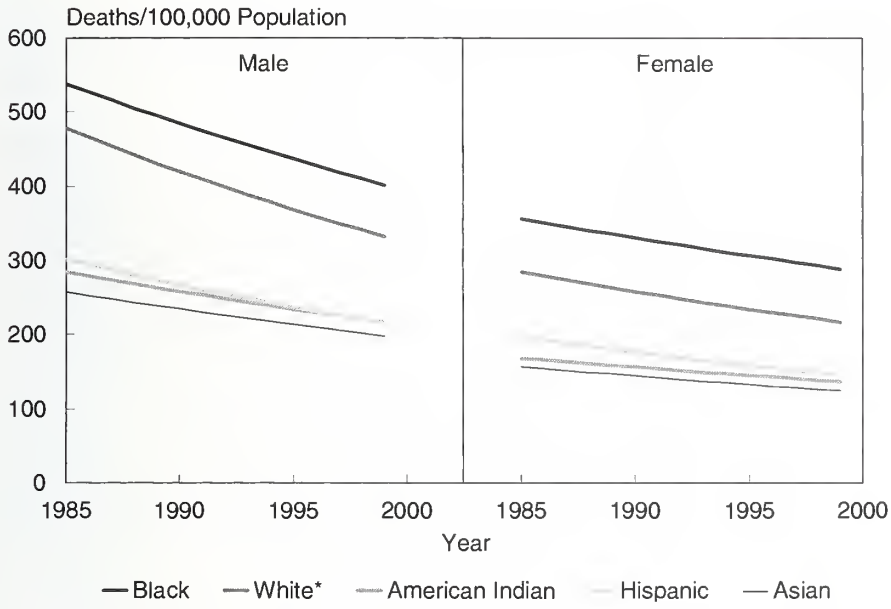
Chart 3–12
Percent Decline in Age-Adjusted Death Rates for Cardiovascular Diseases by State, U.S., 1986–88 to 1996–98

Between 1986–88 and 1996–98, the smallest average annual percent declines in CVD death rates tended to be in the South.[11]



Total Heart Disease

Chart 3–13
Age-Adjusted Death Rates for Heart Disease by Race/Ethnicity and Sex, U.S., 1985–1999

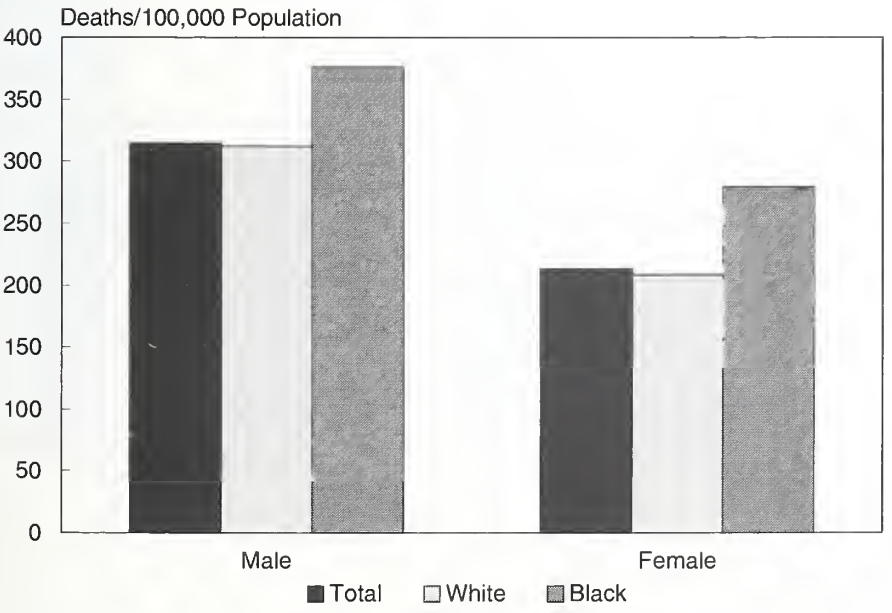


* Non-Hispanic.

Note: Each line is a log linear regression derived from the actual rates.

Between 1985 and 1999, heart disease death rates declined appreciably in blacks, whites, and Hispanics, and more modestly in Asians and American Indians.[27]

Chart 3–14
Age-Adjusted Death Rates for Heart Disease by Race and Sex, U.S., 2000



In 2000, heart disease mortality was 48 percent higher in males than in females. Among males, it was 20 percent higher in blacks than in whites and among females, it was 34 percent higher in blacks than in whites.[24, 26]

Total Heart Disease/Coronary Heart Disease

Chart 3–15
Death Rates for Heart Disease
by Age, Race, and Sex, U.S., 2000

Within sex groups, heart disease mortality was higher in blacks than in whites at all ages. Within race groups, it was higher in males than in females.[24, 26]

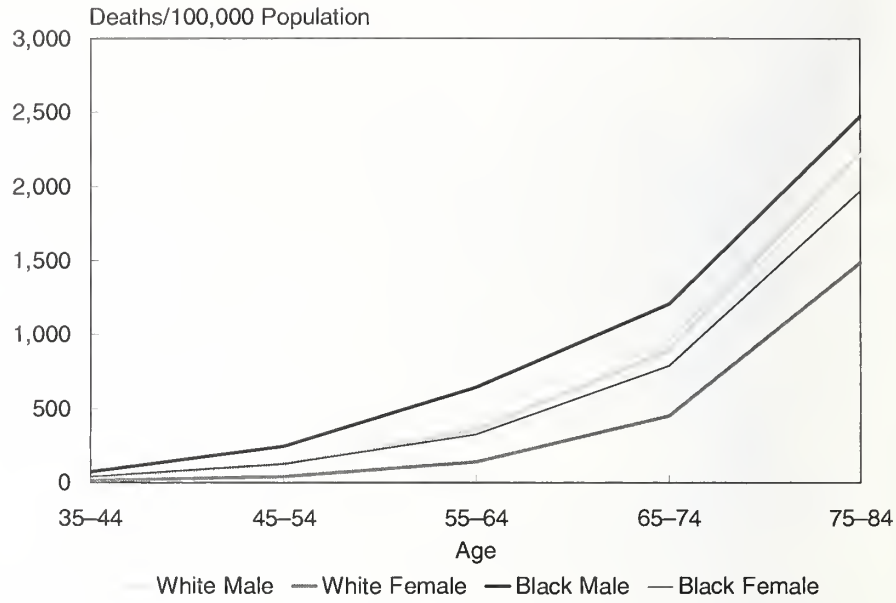
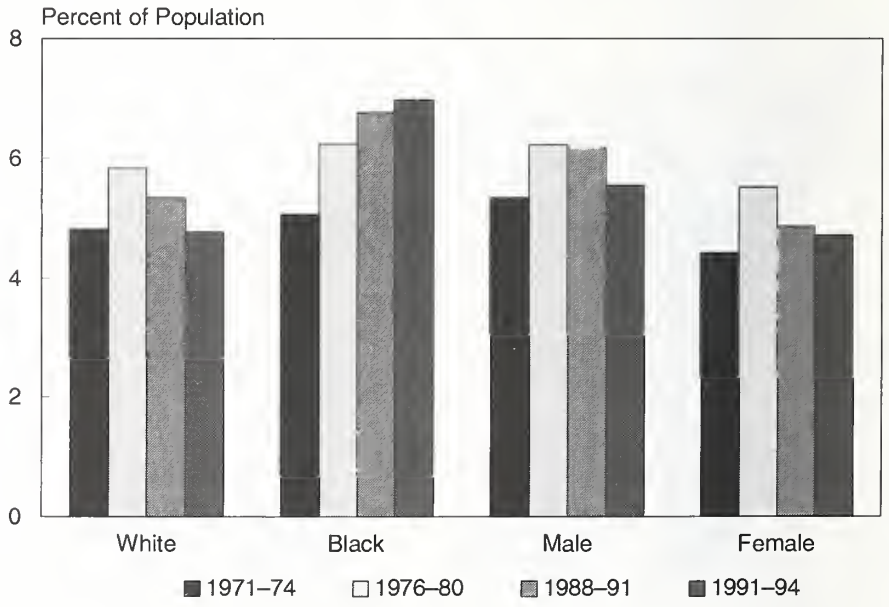


Chart 3–16
Prevalence* of Coronary Heart Disease by Race and Sex,
Ages 25–74, U.S., 1971–74 to 1991–94

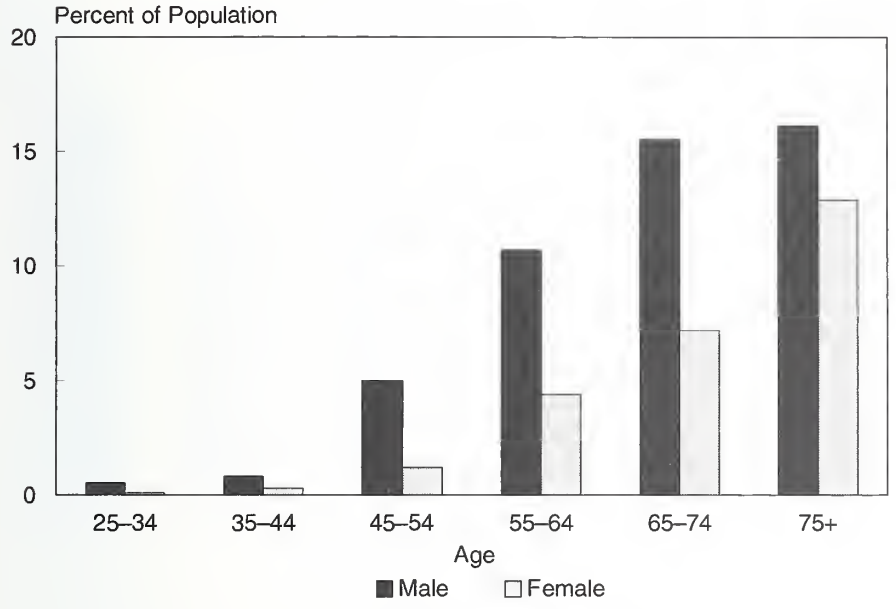
The prevalence of CHD increased in blacks between 1971–74 and 1991–94; it decreased in whites, males, and females between 1976–80 and 1991–94.[14]



* Age-adjusted.

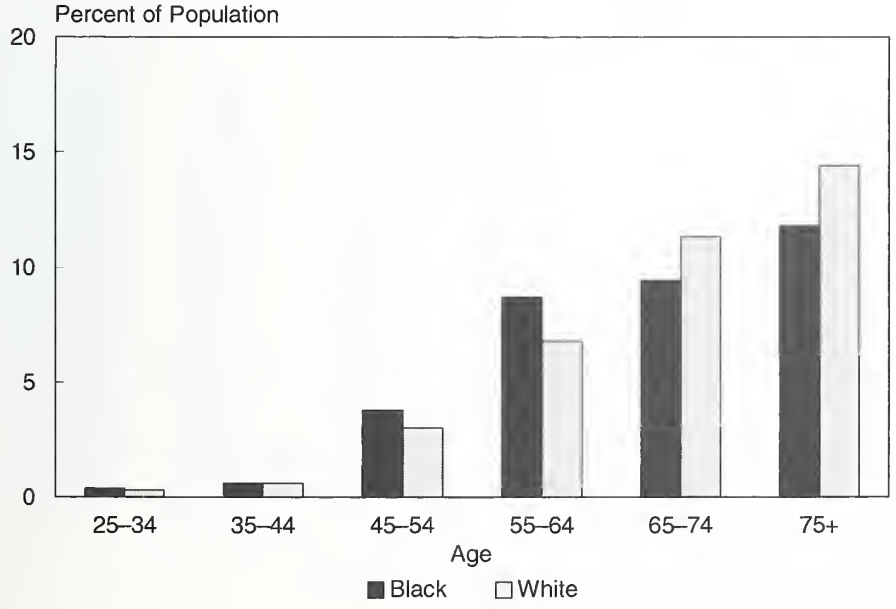
Coronary Heart Disease

Chart 3–17
Prevalence of Acute Myocardial Infarction by Age and Sex, U.S., 1988–94



The prevalence of AMI was greater in males than in females at all ages.[14]

Chart 3–18
Prevalence of Acute Myocardial Infarction by Age and Race, U.S., 1988–94



The prevalence of AMI was greater in blacks younger than 65, but higher in whites 65 and older.[14]

Coronary Heart Disease

Chart 3–19
Prevalence of Angina Pectoris by Age and Sex, U.S., 1988–94

The prevalence of angina pectoris was greater in females between ages 25 and 74; after age 75, it was greater in males.[14]

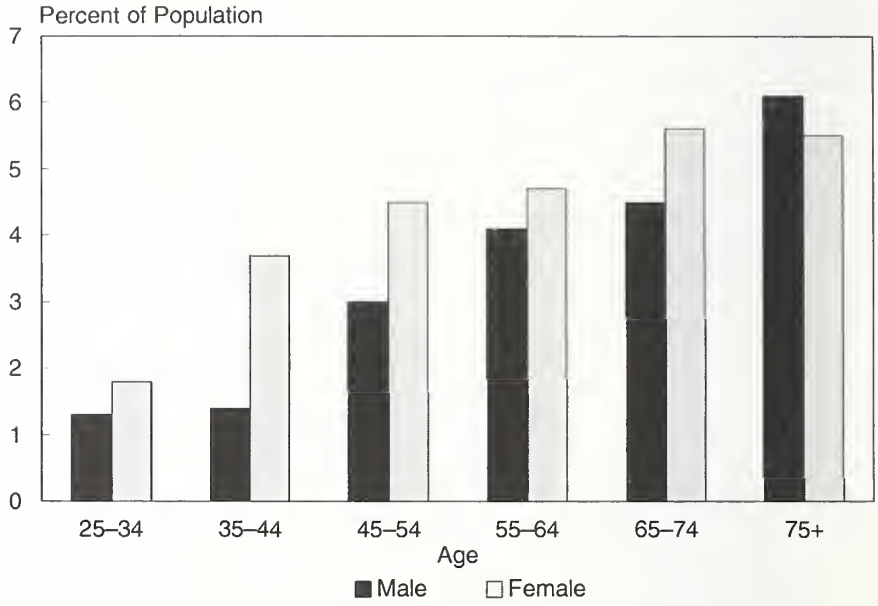
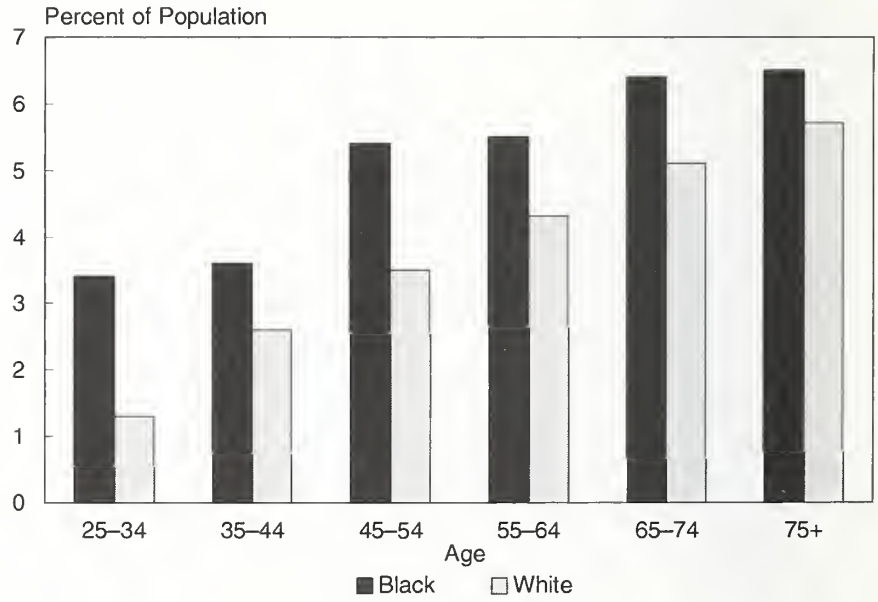


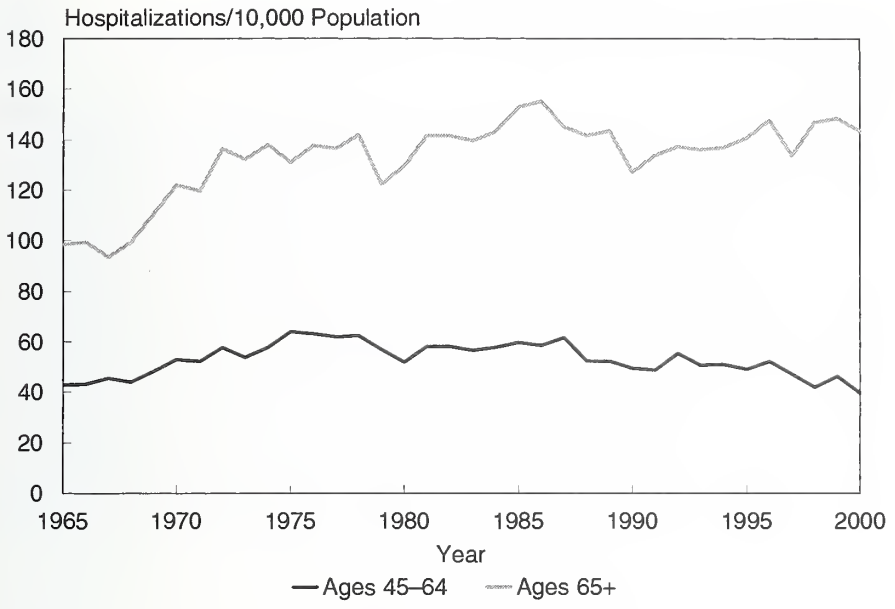
Chart 3–20
Prevalence of Angina Pectoris by Age and Race, U.S., 1988–94

The prevalence of angina pectoris was greater in blacks than in whites at all ages.[14]



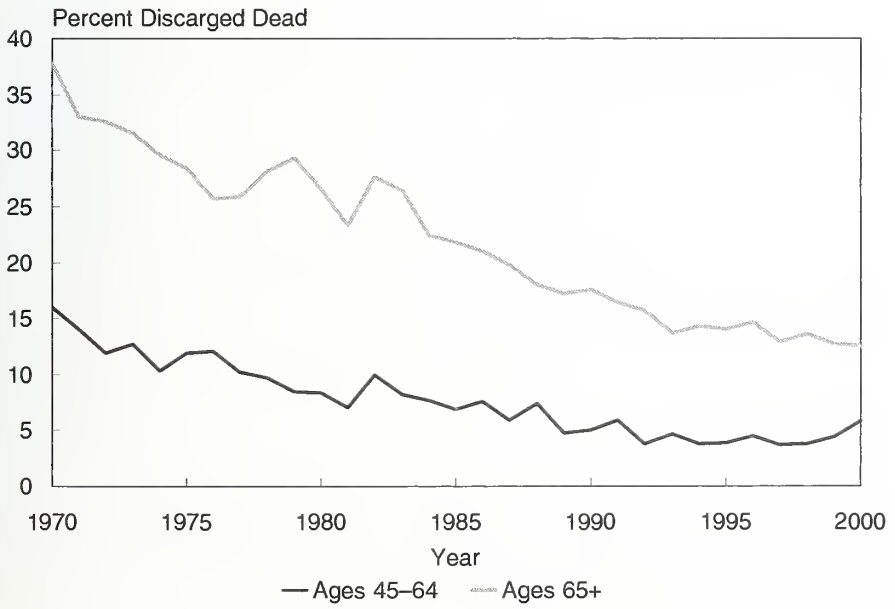
Coronary Heart Disease

Chart 3–21
Hospitalization Rates for Acute Myocardial Infarction, Ages 45–64 and 65+, U.S., 1965–2000



The AMI hospitalization rate for individuals ages 45–64 increased between 1965 and the mid-1970s; after that, it declined modestly. For individuals ages 65 and older, the rate increased from 1965 to its peak in 1986. Since then it has fluctuated.[28–29]

Chart 3–22
Hospital Case-Fatality Rates for Acute Myocardial Infarction, Ages 45–64 and 65+, U.S., 1970–2000

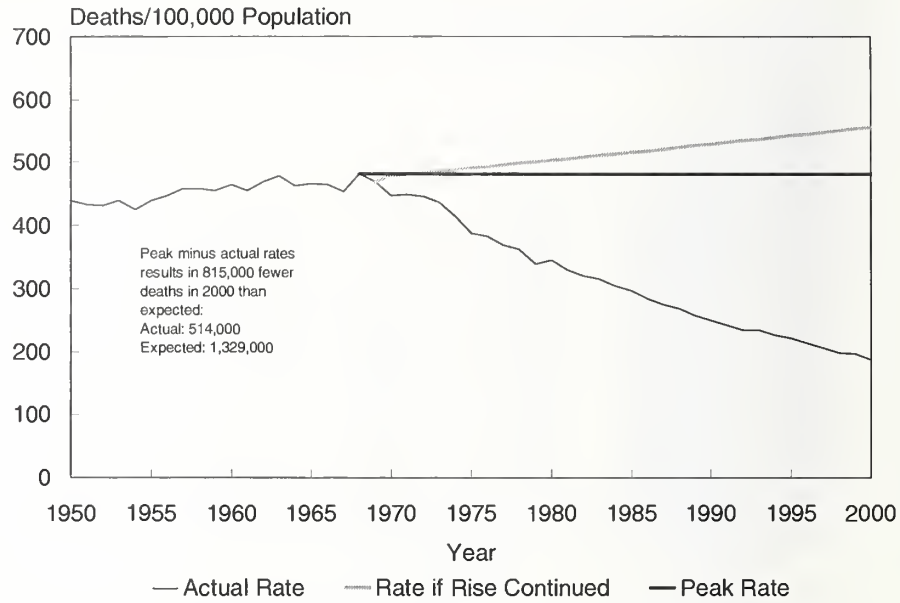


Between 1970 and 2000, AMI hospital case-fatality rates declined substantially for individuals ages 45–64 and 65 and older.[28–29]

Coronary Heart Disease

CHD accounted for 514,000 deaths in 2000. It would have accounted for 1,329,000 deaths if the rate had remained at its 1968 peak.[11, 22–25]

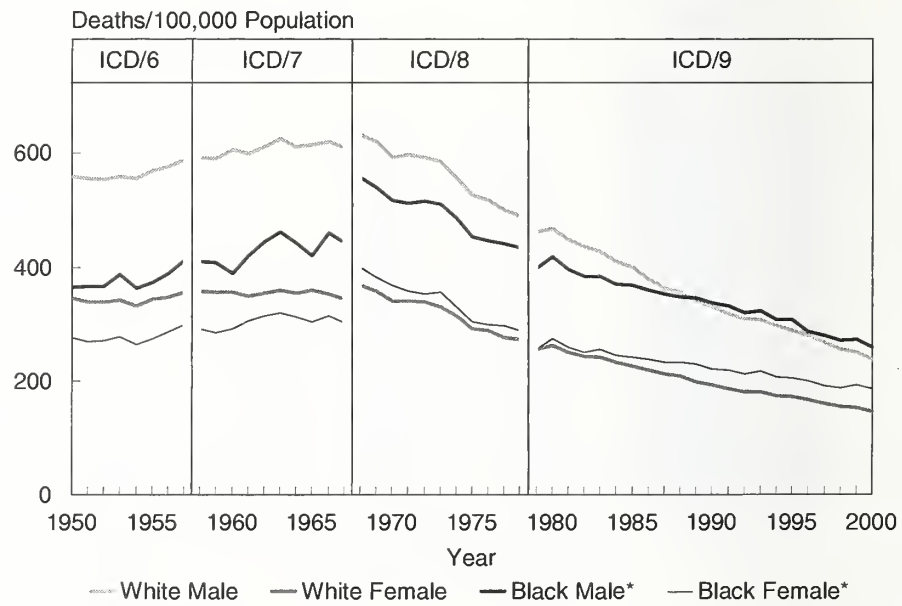
Chart 3–23
Age-Adjusted Death Rates for Coronary Heart Disease, Actual and Expected, U.S., 1950–2000



Note: Comparability ratio applied to rates for 1999–2000.

In the 1950s and 1960s, CHD death rates increased for blacks and white males; they were relatively stable for white females. Since then, the rates have declined appreciably.[11, 22–26]

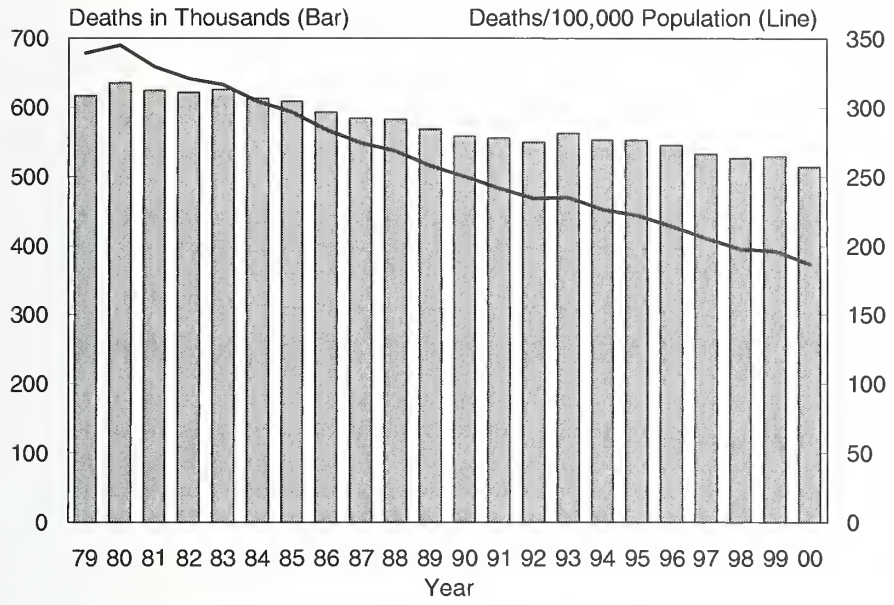
Chart 3–24
Age-Adjusted Death Rates for Coronary Heart Disease by Race and Sex, U.S., 1950–2000



* Nonwhite from 1950–1967.

Coronary Heart Disease

Chart 3–25
Deaths and Age-Adjusted Death Rates for Coronary Heart Disease, U.S., 1979–2000



Since 1980, the number of deaths and the age-adjusted death rates for CHD have decreased almost every year.[11, 22, 24]

Chart 3–26
Average Annual Percent Change in Age-Adjusted Death Rates for Coronary Heart Disease by Race and Sex, U.S., 1950–2000

Period	Total Pop.	White Male	White Female	Black Male	Black Female
1950–1960	0.7	0.9	0.6	1.2	0.8
1960–1970	-0.1	0.1	-0.1	2.8	2.4
1970–1980	-3.1	-2.8	-3.2	-2.7	-3.5
1980–1990	-3.1	-3.4	-3	-1.9	-1.8
1990–2000	-2.8	-3.2	-2.6	-2.6	-1.8

Since 1980, white males and females experienced steeper declines in CHD mortality than black males and females.[11, 22–26]

Coronary Heart Disease

Chart 3–27
Average Annual Percent Change in Death Rates for Coronary Heart Disease by Age, Race, and Sex, U.S., 1990–1998

Between 1990 and 1998, the average annual percent declines in CHD mortality ages 55 and older tended to be smaller with advancing age for white males and females and black females.[11]

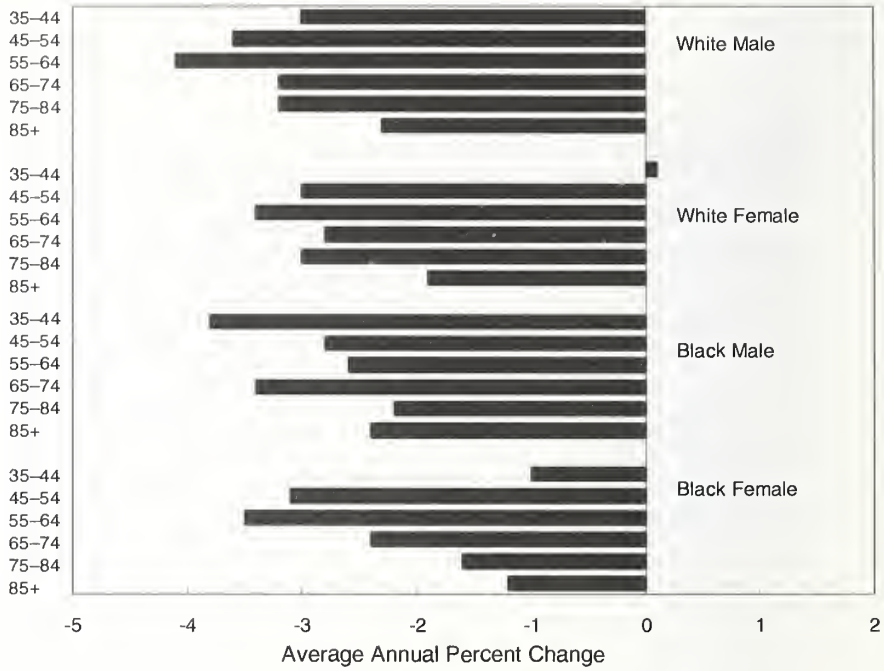
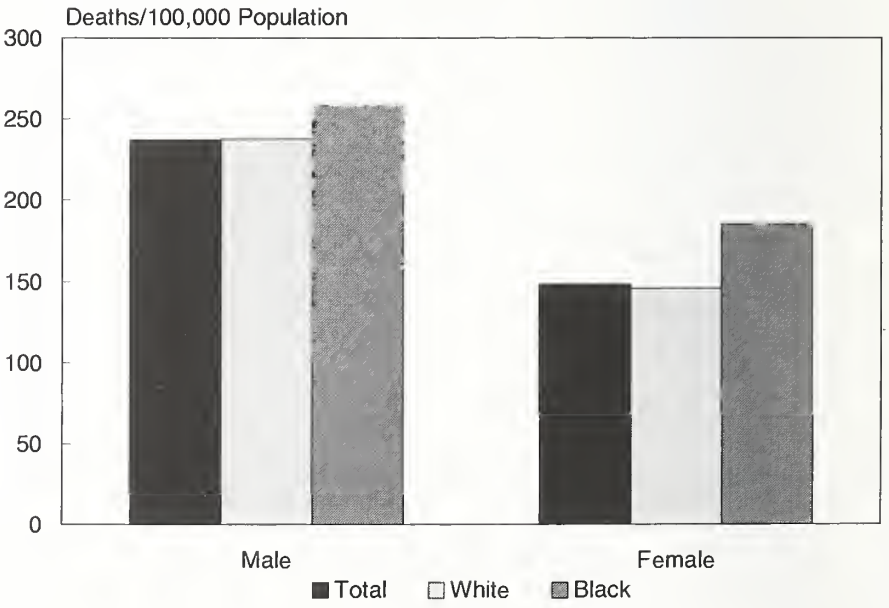


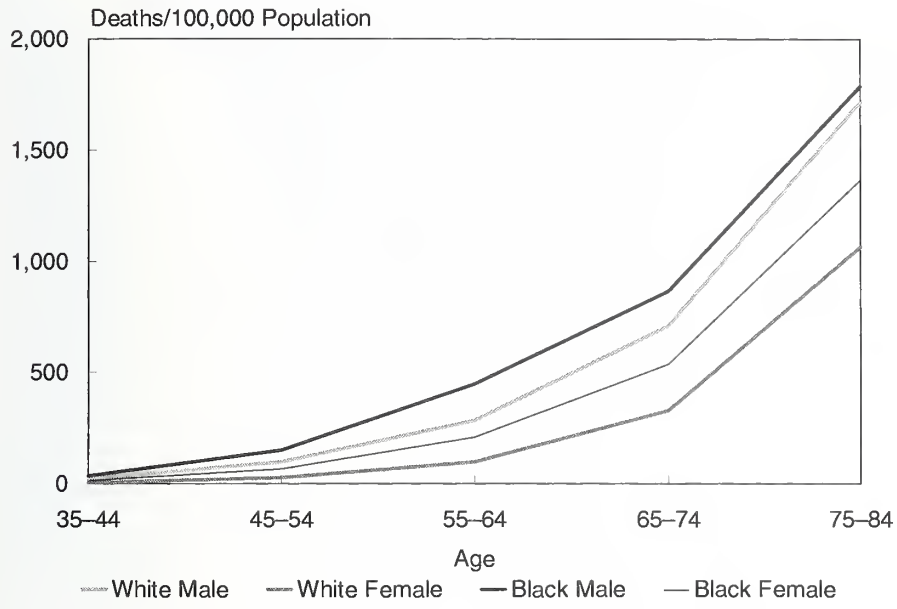
Chart 3–28
Age-Adjusted Death Rates for Coronary Heart Disease by Race and Sex, U.S., 2000

In 2000, CHD mortality within sex groups was higher in blacks than in whites; it was considerably higher in males than in females.[24, 26]



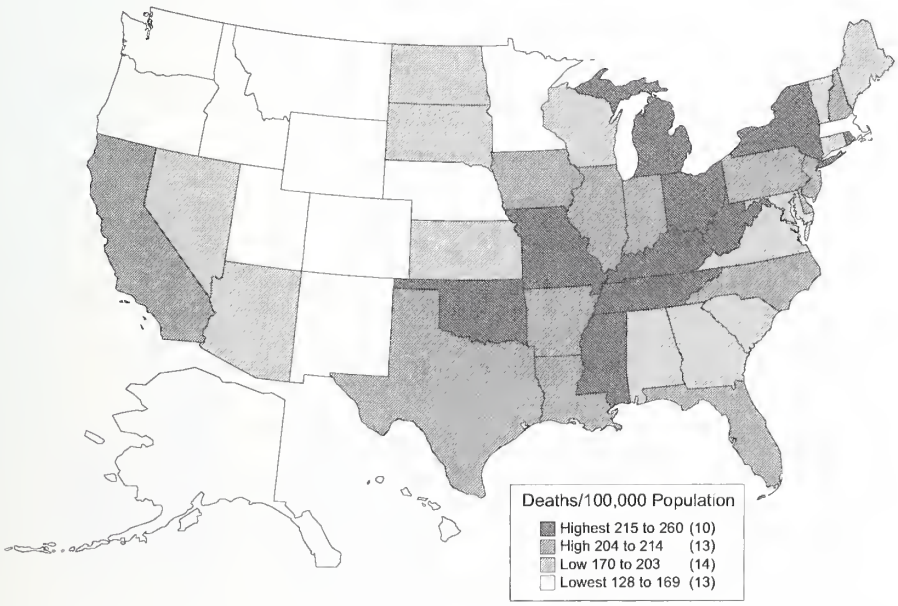
Coronary Heart Disease

Chart 3–29
Death Rates for Coronary Heart Disease
by Age, Race, and Sex, U.S., 2000



In 2000, CHD mortality within sex groups was higher in blacks than in whites for all age groups. Death rates were also higher in males than in females.[24, 26]

Chart 3–30
Age-Adjusted Death Rates for Coronary Heart Disease
by State, U.S., 1996–98

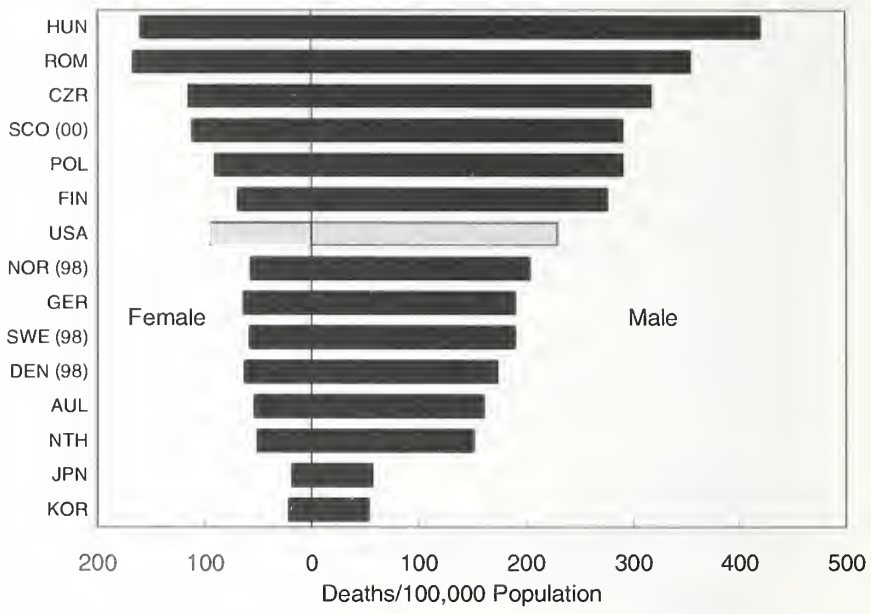


In 1996–98, high CHD death rates were in a narrow band of States from New York through Appalachia to Oklahoma. Many western Mountain States had low rates.[11]

Coronary Heart Disease

In 1999, among 15 industrialized countries, the United States ranked seventh highest for CHD mortality in males and fifth in females.[8]

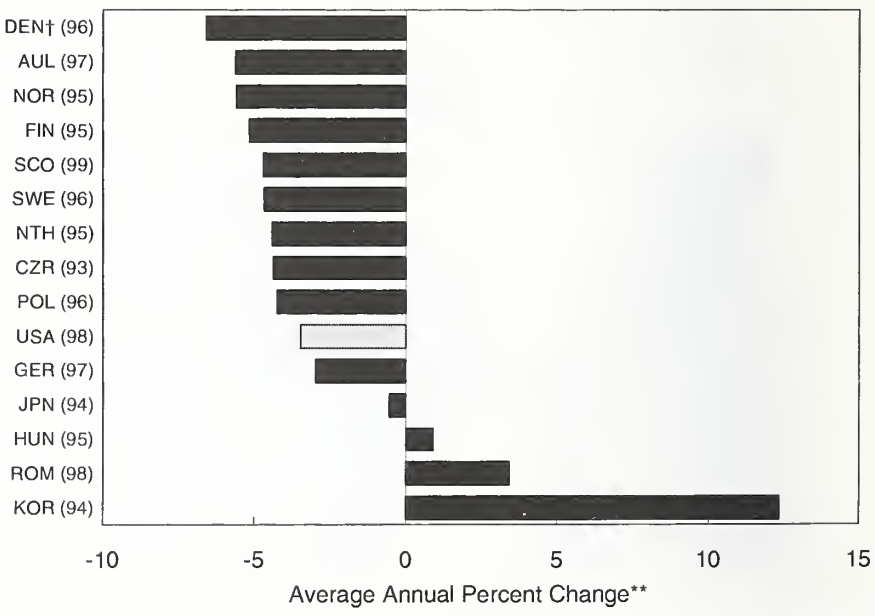
Chart 3–31
Age-Adjusted Death Rates* for Coronary Heart Disease by Country and Sex, Ages 35–74, 1999



*Age-adjusted to European standard.
Note: Data for 1999 unless otherwise noted in parentheses.

Between 1990 and 1999 (or latest data year), nine countries had a steeper decline in CHD mortality in males than the United States.[8]

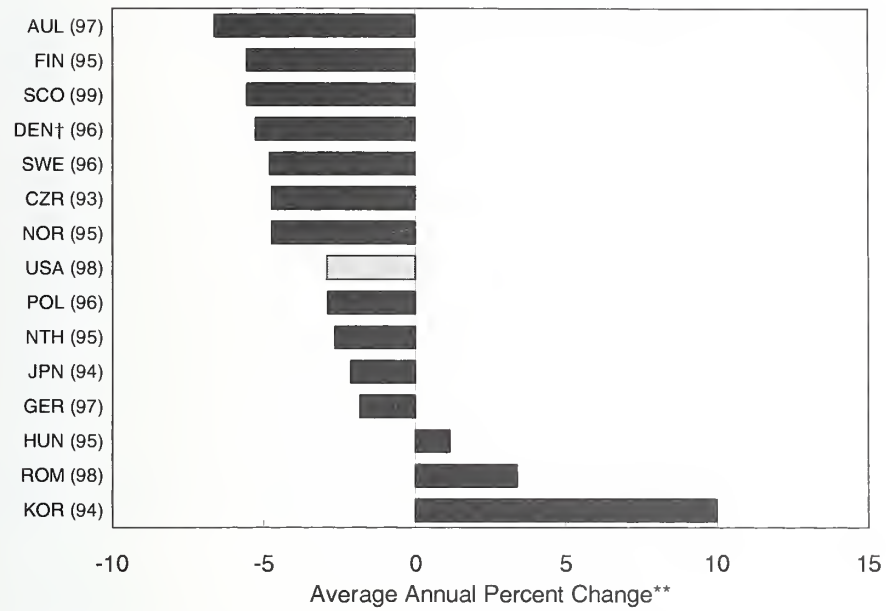
Chart 3–32
Change in Age-Adjusted Death Rates* for Coronary Heart Disease in Males by Country, Ages 35–74, 1990–1999



* Age-adjusted to the European standard.
† Eighth revision of the ICD.
** Based on a log linear regression of the actual rates.
Note: The latest data years are indicated in parentheses.

Coronary Heart Disease/Congestive Heart Failure

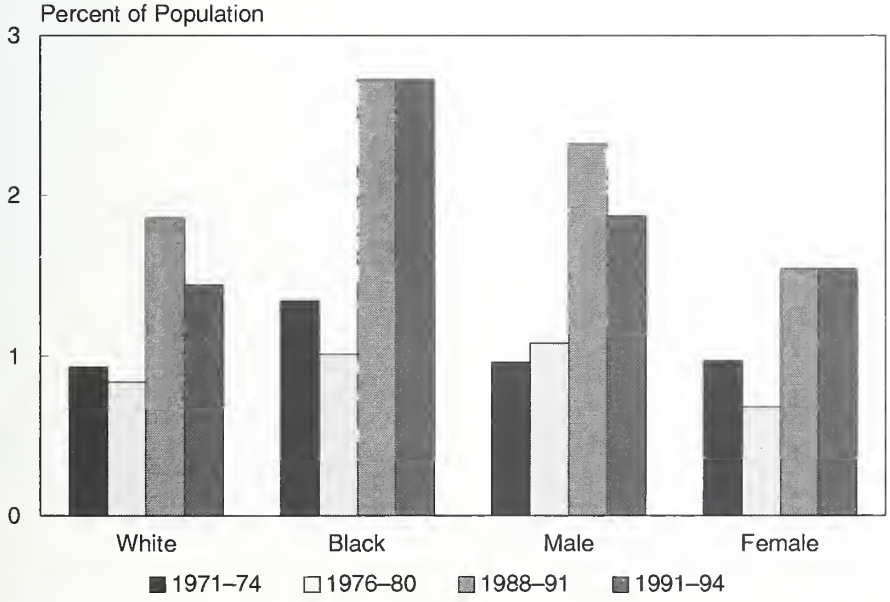
Chart 3–33
Change in Age-Adjusted Death Rates* for Coronary Heart Disease in Females by Country, Ages 35–74, 1990–1999



* Age-adjusted to the European standard.
† Eighth revision of the ICD.
** Based on a log linear regression of the actual rates.
Note: The latest data years are indicated in parentheses.

Between 1990 and 1999, seven countries had a steeper decline in CHD mortality in females than the United States.[8]

Chart 3–34
Prevalence* of Congestive Heart Failure by Race and Sex, Ages 25–74, U.S., 1971–74 to 1991–94



* Age-adjusted.

Between 1976–80 and 1988–91, the prevalence of CHF increased substantially in each group: male and female, black and white.[14]

Congestive Heart Failure

Chart 3–35
Hospitalization Rates for Congestive Heart Failure, Ages 45–64 and 65+, U.S., 1971–2000

Between 1971 and 2000, CHF hospitalization rates more than tripled for individuals ages 45–64 and 65 and older.[28–29]

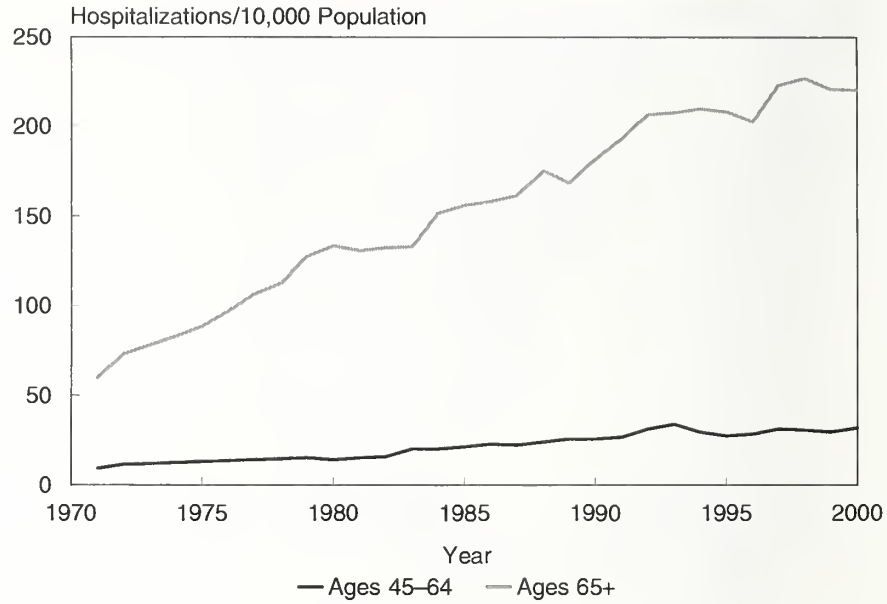
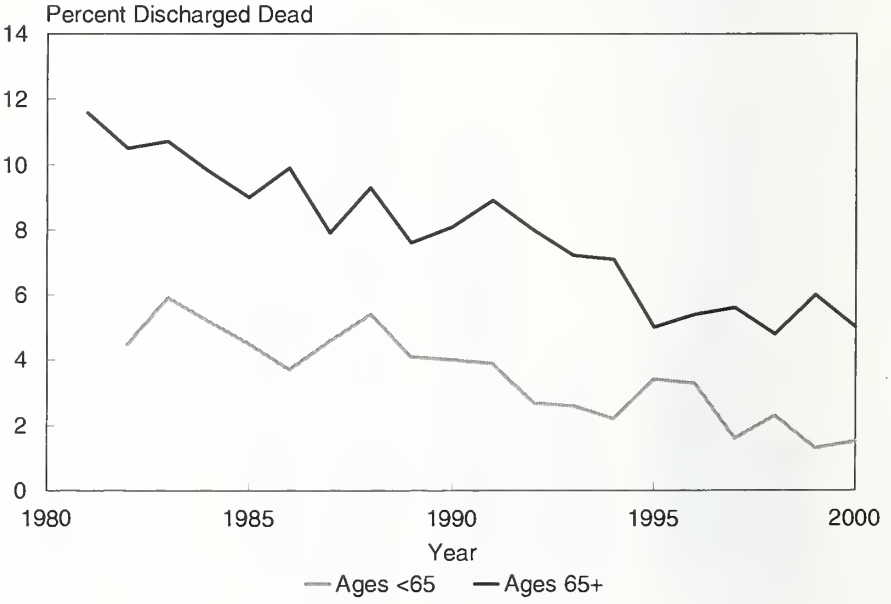


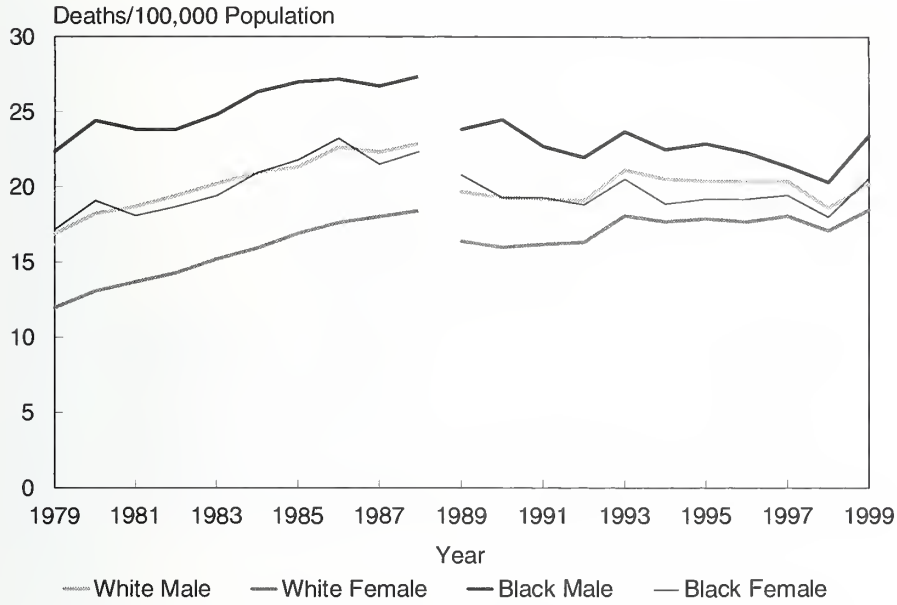
Chart 3–36
Hospital Case-Fatality Rates for Congestive Heart Failure, Ages <65 and 65+, U.S., 1981–2000

The percent of CHF hospital discharges that were discharged dead declined during the 1981–2000 period for individuals younger than 65 and ages 65 and older.[28–29]



Congestive Heart Failure

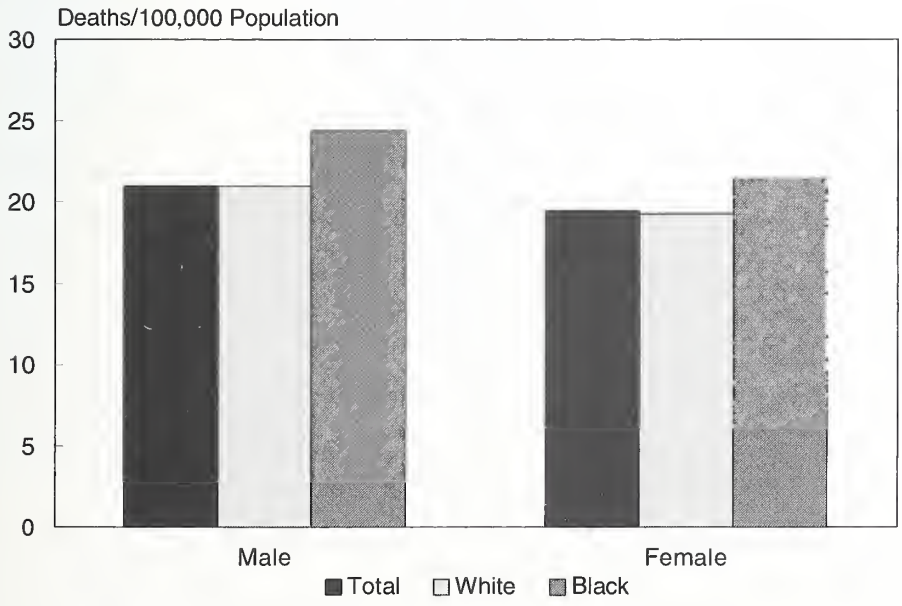
Chart 3–37
Age-Adjusted Death Rates for Congestive Heart Failure by Race and Sex, U.S., 1979–1999



Note: The break in the trend lines is intended to signal a discrepancy arising from the adoption of new cause-of-death coding instructions on death certificates in 1989.

In the 1990s, CHF death rates for whites and blacks leveled off after steady increases.[11, 23–25]

Chart 3–38
Age-Adjusted Death Rates for Congestive Heart Failure by Race and Sex, U.S., 1999

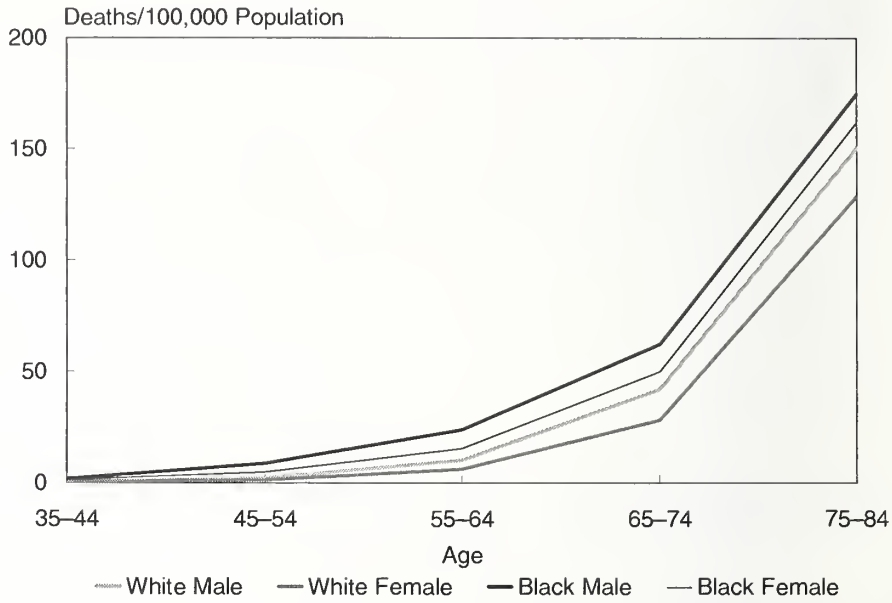


In 1999, death rates for CHF within sex groups were slightly higher in blacks than in whites; they were relatively similar in males and females.[11]

Congestive Heart Failure

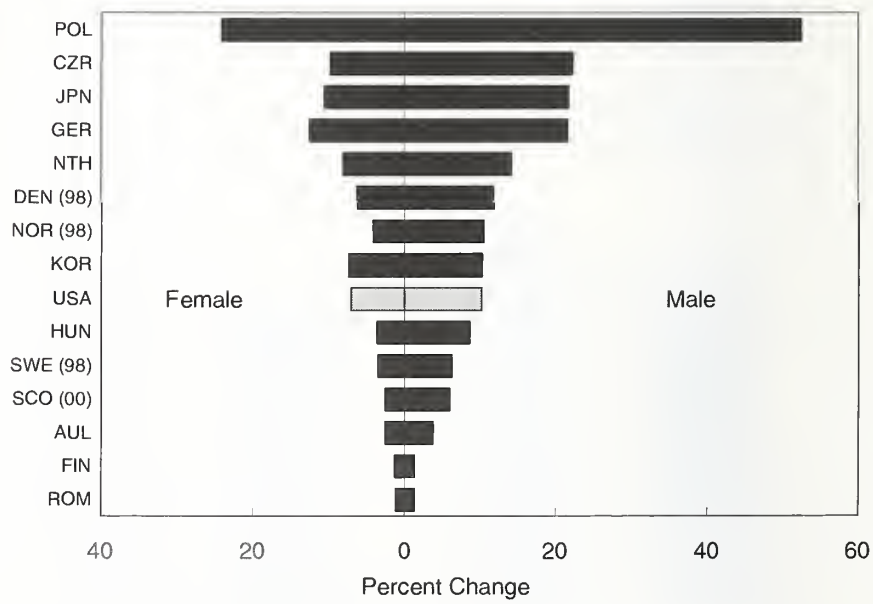
In 1999, CHF mortality was higher in blacks than in whites at all ages. Within race groups, it was higher in males than in females.[11]

Chart 3–39
Death Rates for Congestive Heart Failure by Age, Race, and Sex, U.S., 1999



In 1999, the United States ranked ninth highest for heart failure mortality in males and seventh highest for females.[8]

Chart 3–40
Age-Adjusted Death Rates* for Heart Failure by Country and Sex, Ages 35–74, 1999

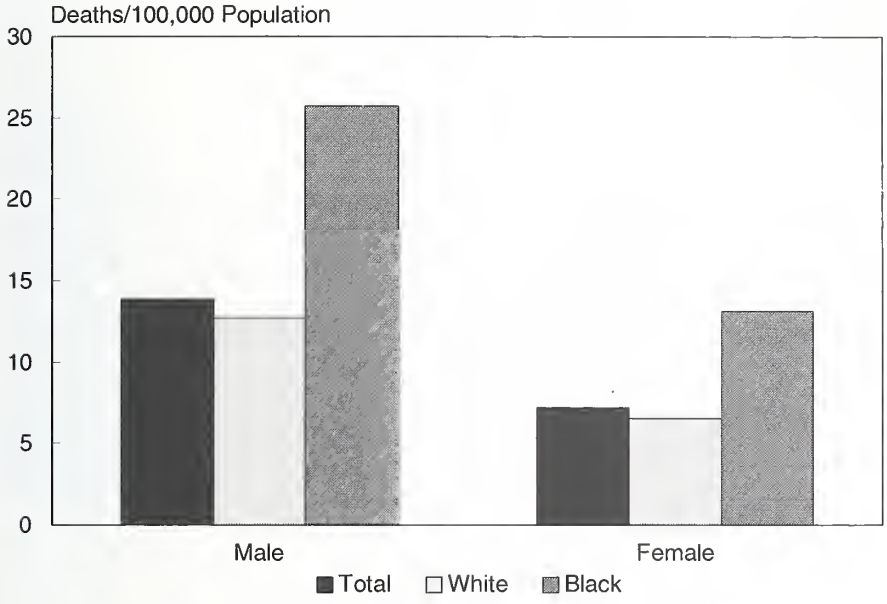


*Age-adjusted to European standard.

Note: Data for 1999 unless otherwise noted in parentheses.

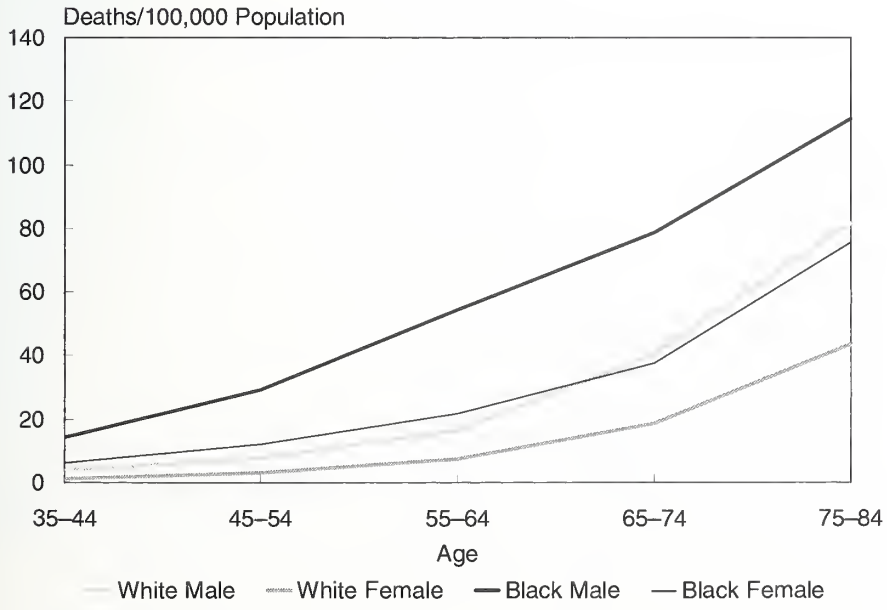
Cardiomyopathy

Chart 3–41
Age-Adjusted Death Rates for Cardiomyopathy by Race and Sex, U.S., 1999



In 1999, the cardiomyopathy death rate was approximately twice as high in blacks as in whites. It was also approximately twice as high in males as in females.[11]

Chart 3–42
Death Rates for Cardiomyopathy by Age, Race, and Sex, U.S., 1999



In 1999, within sex groups, cardiomyopathy mortality was higher in blacks than in whites at each age; within race groups, it was higher in males than in females.[11]

Atrial Fibrillation

Chart 3–43
Hospitalizations for Atrial Fibrillation, U.S., 1982–1999

Between 1982 and 1999, hospitalizations with atrial fibrillation as a primary or secondary diagnosis increased.[28–29]

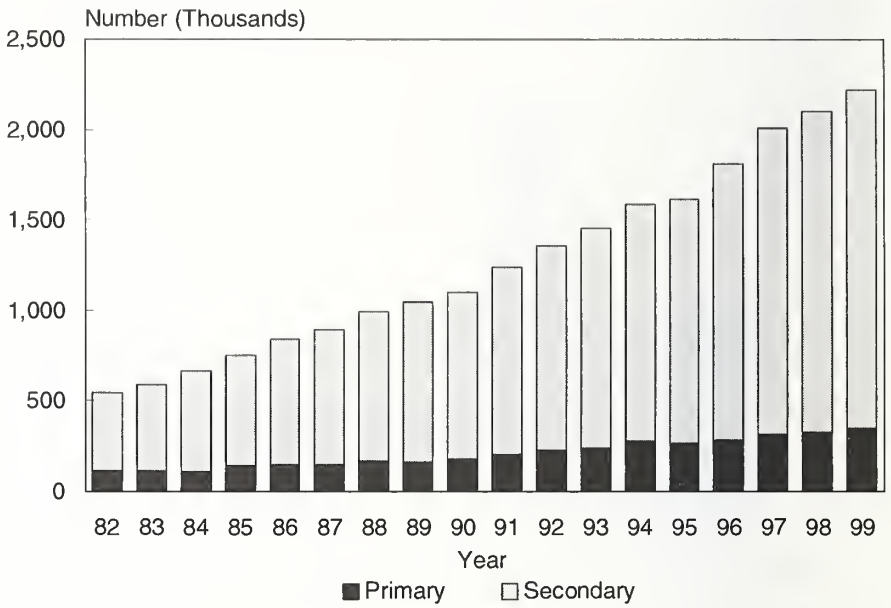
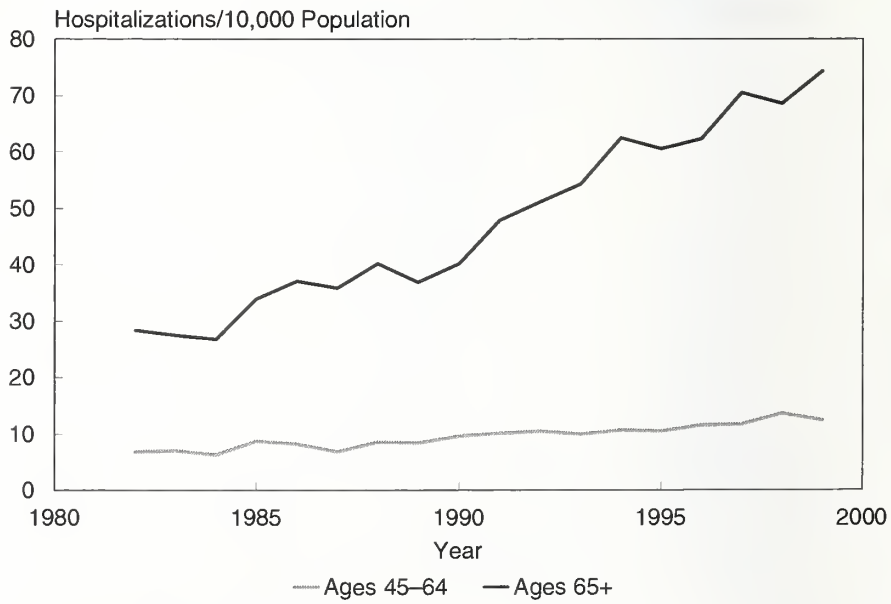


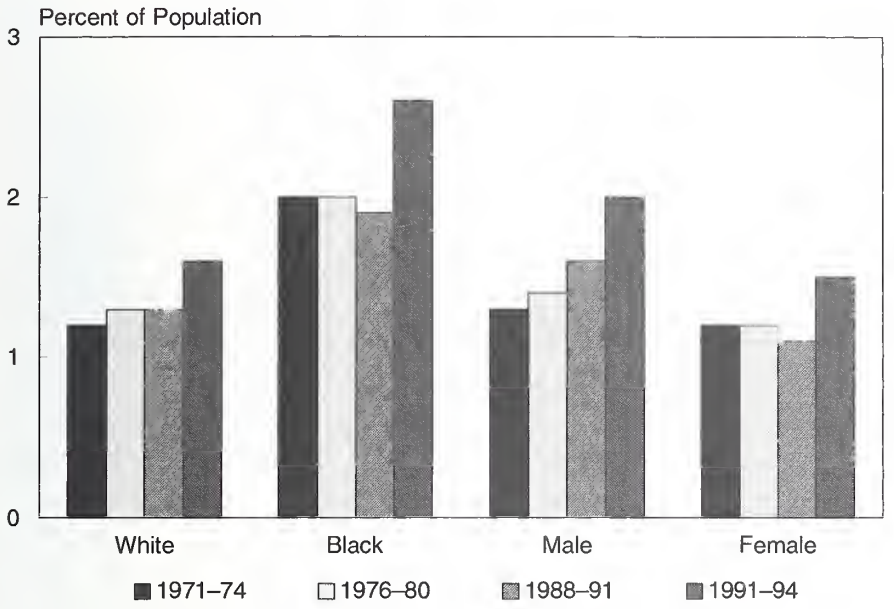
Chart 3–44
Hospitalization Rates for Atrial Fibrillation by Age, U.S., 1982–1999

Between 1982 and 1999, the hospitalization rate for atrial fibrillation in patients ages 45–65 increased more than 80 percent; it more than doubled for those ages 65 and older.[28–29]



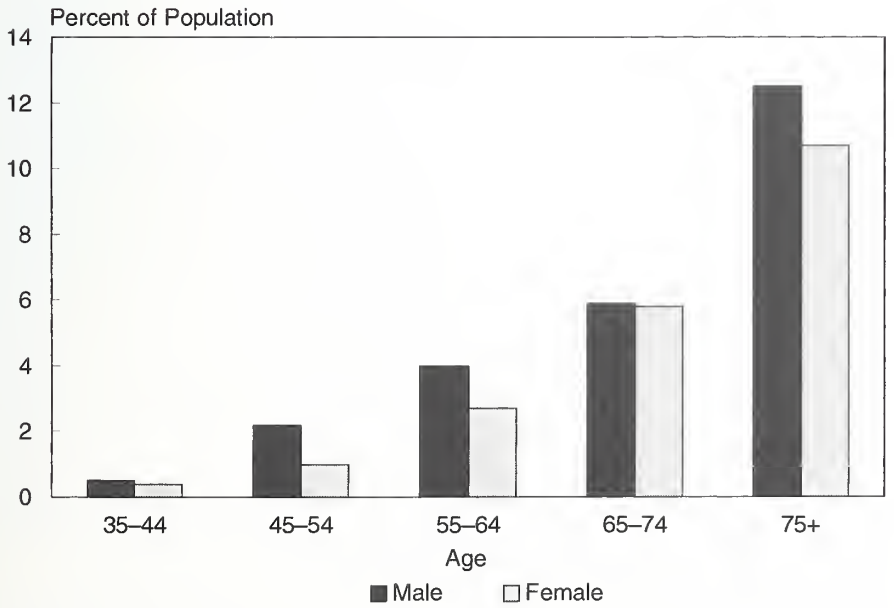
Cerebrovascular Diseases (Stroke)

Chart 3–45
Prevalence of Stroke, Ages 25–74,
U.S., 1971–74 to 1991–94



Between 1971–74 and 1991–94, the prevalence of stroke increased in males and females and in blacks and whites.[14]

Chart 3–46
Prevalence of Stroke by Age and Sex,
U.S., 1988–94



In 1988–94, the prevalence of stroke was higher in males than in females at all ages.[14]

Cerebrovascular Diseases (Stroke)

Chart 3–47
Prevalence of Stroke by Age and Race, U.S., 1988–94

In 1988–94, the prevalence of stroke was higher in blacks than in whites at all ages.[14]

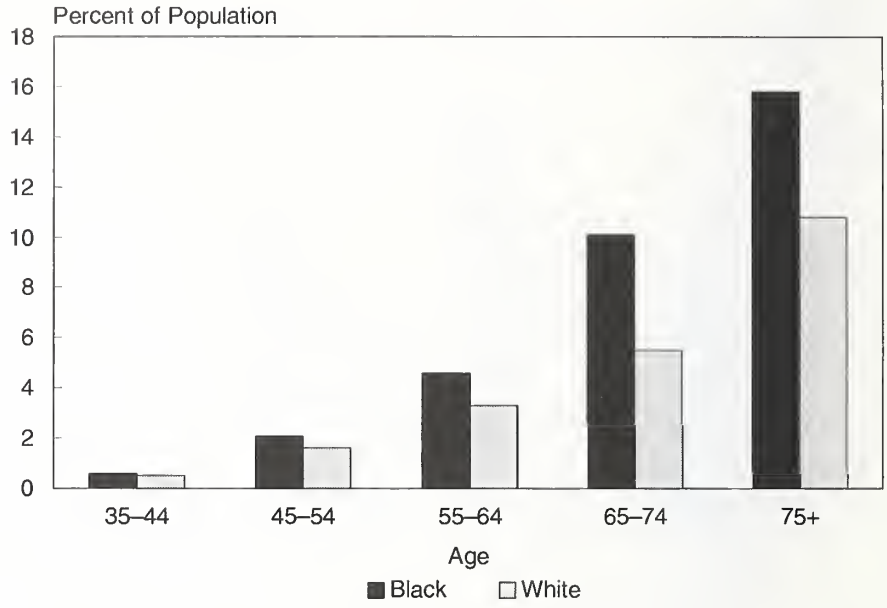
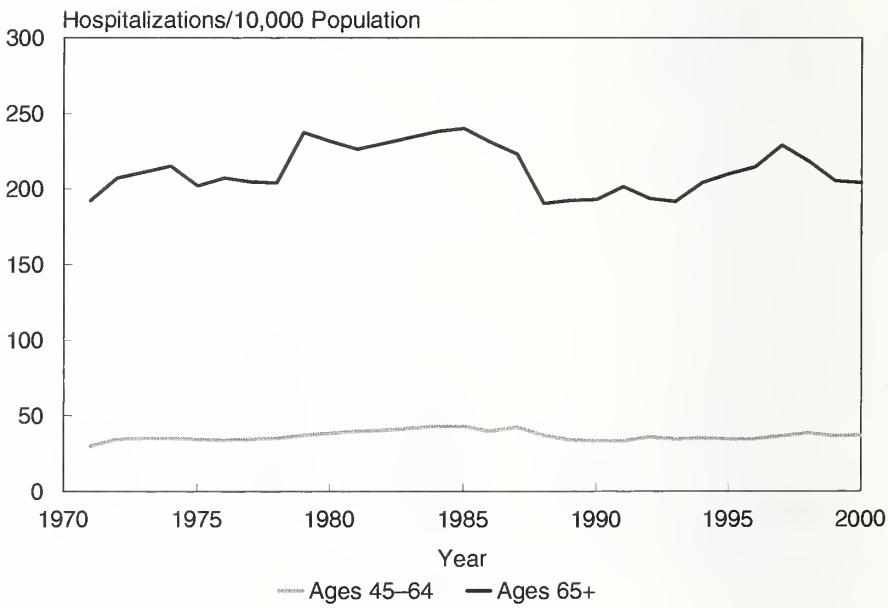


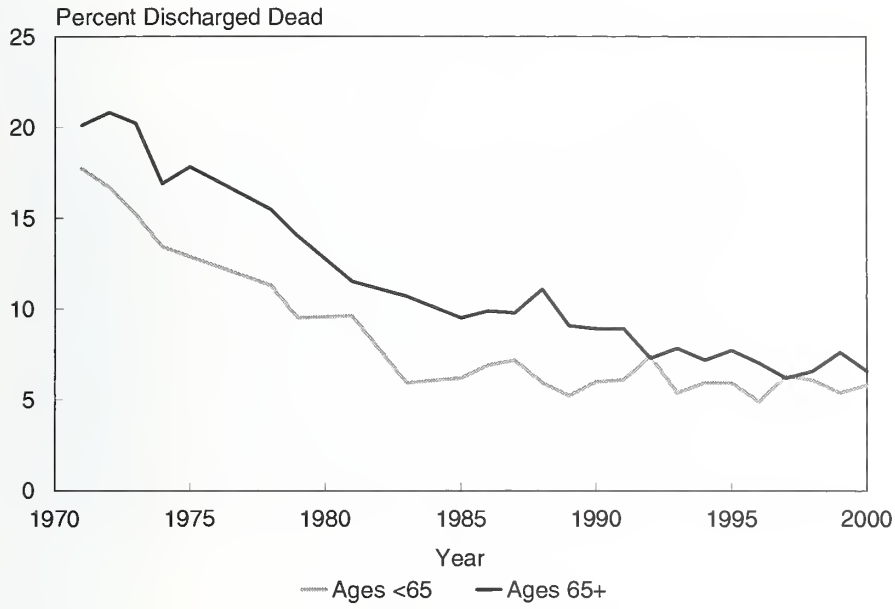
Chart 3–48
Hospitalization Rates for Stroke, Ages 45–64 and 65+, U.S., 1971–2000

Hospitalization rates for stroke in patients ages 45–64 and 65 and older increased between 1971 and the mid-1980s; no clear trend followed to 2000.[28–29]



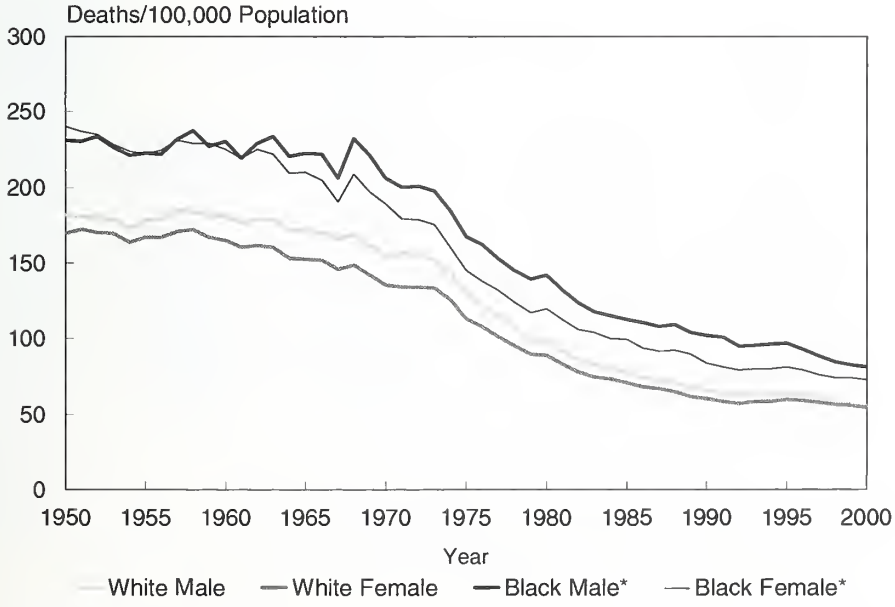
Cerebrovascular Diseases (Stroke)

Chart 3–49
Hospital Case-Fatality Rate for Stroke, Ages <65 and 65+, U.S., 1971–2000



Hospital case-fatality rates for stroke in both groups declined appreciably between 1971 and the mid-1980s and modestly thereafter.[28–29]

Chart 3–50
Age-Adjusted Death Rates for Stroke by Race and Sex, U.S., 1950–2000



The steep decline in stroke mortality that occurred for all four groups in the 1970s slowed in the 1980s and 1990s.[11, 22–26]

* Nonwhite from 1950 to 1967.

Cerebrovascular Diseases (Stroke)

Chart 3–51
Deaths and Age-Adjusted Death Rates for Stroke, U.S., 1979–2000

Between 1979 and the early 1990s, the number of deaths and the age-adjusted death rates for stroke declined. The number of deaths remained relatively stable after the mid-1990s, while the adjusted rates continued to drop.[11, 22, 24]

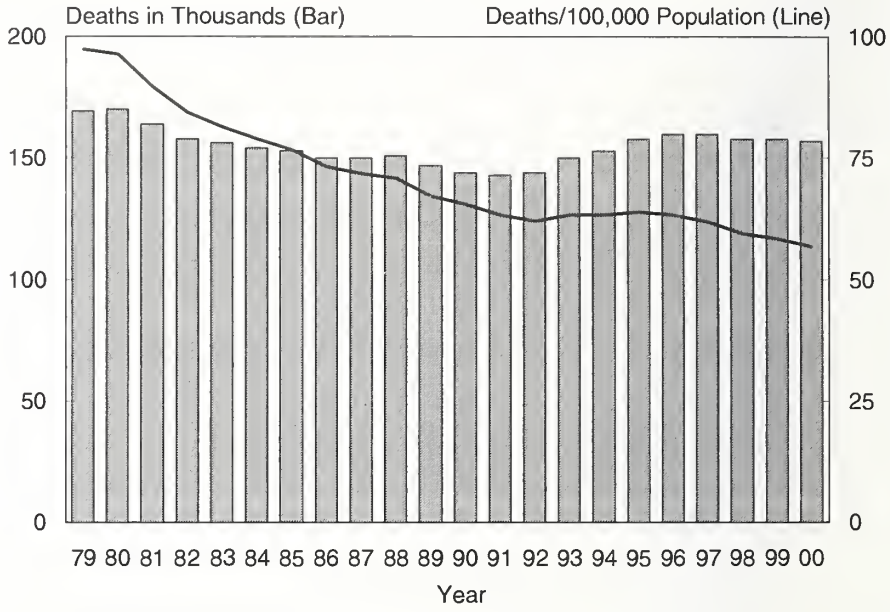
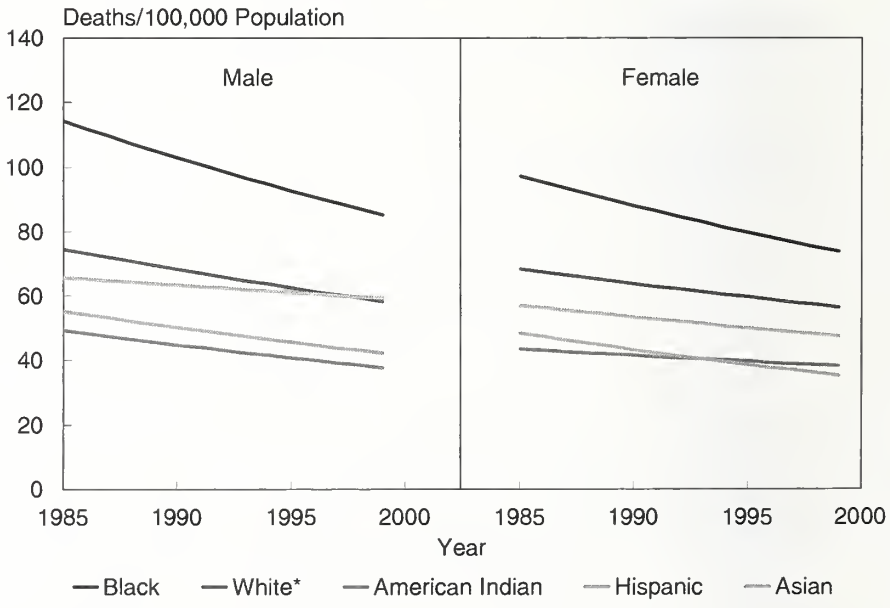


Chart 3–52
Age-Adjusted Death Rates for Stroke by Race/Ethnicity and Sex, U.S., 1985–1999

Between 1985 and 1999, stroke mortality declined for all groups. The decrease was modest among Asian males and American Indian females.[27]



* Non-Hispanic.

Note: Each line is a log linear regression derived from the actual rates.

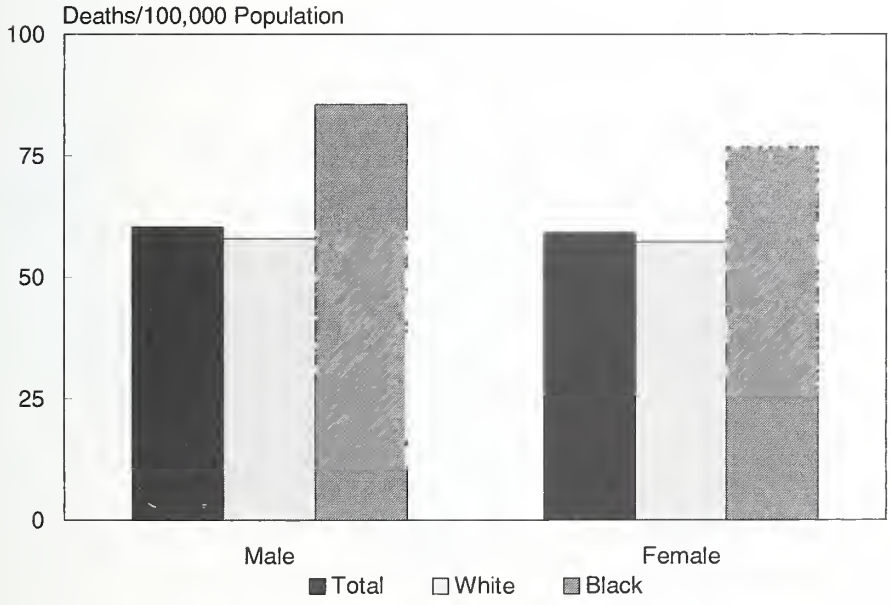
Cerebrovascular Diseases (Stroke)

Chart 3–53
Average Annual Percent Change in Age-Adjusted Death Rates for Stroke by Race and Sex, U.S., 1960–1998

Period	Total Population	White Male	White Female	Black Male	Black Female
1960–1965	-1.3	-1.0	-1.5	-0.4	-1.4
1965–1970	-2.2	-2.0	-2.2	-0.8	-1.5
1970–1975	-3.2	-3.0	-3.1	-3.6	-4.7
1975–1980	-5.2	-5.8	-5.0	-3.7	-4.2
1980–1985	-4.4	-4.6	-4.4	-4.5	-3.6
1985–1990	-3.0	-3.1	-3.1	-1.8	-2.7
1990–1995	-0.3	-0.5	-0.2	-1.2	-0.7
1995–2000	-2.4	-3.1	-1.9	-3.7	-2.2

The steep declines in stroke mortality that occurred in males and females and in whites and blacks during the 1970s and 1980s were followed by modest changes from 1990 to 1995 and appreciable declines from 1995 to 2000.[11, 22–26]

Chart 3–54
Age-Adjusted Death Rates for Stroke by Race and Sex, U.S., 2000



In 2000, stroke mortality was appreciably higher in blacks than in whites and about the same in males and females.[24, 26]

Cerebrovascular Diseases (Stroke)

Chart 3–55
Death Rates for Stroke by Age, Race, and Sex, U.S., 2000

In 2000, stroke mortality was higher in blacks than in whites at all ages. Within race groups, it was higher in males than in females.[24, 26]

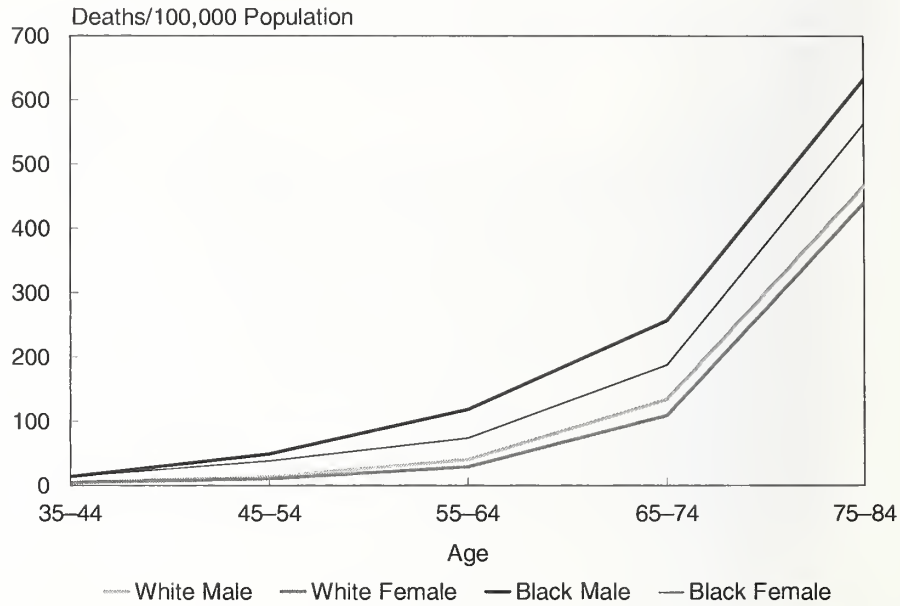
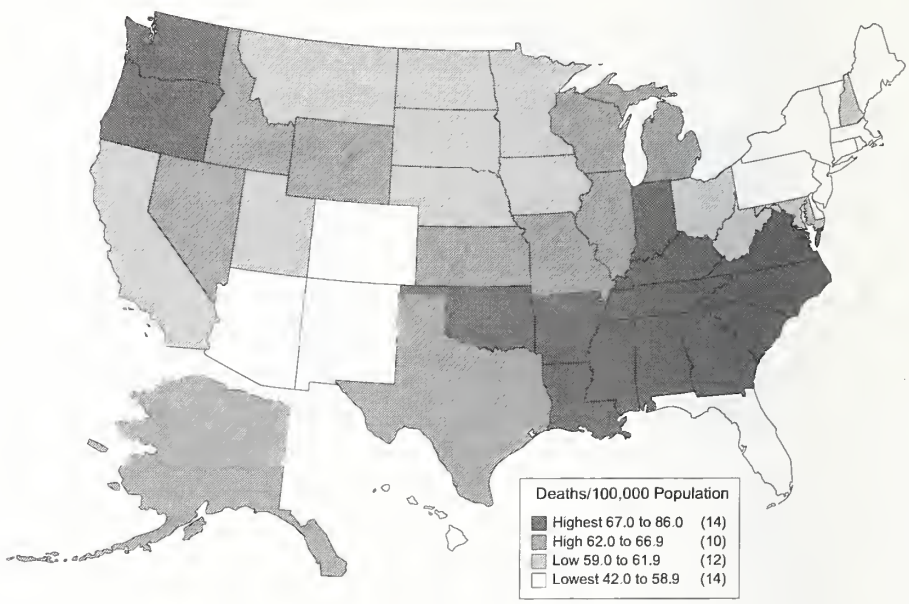


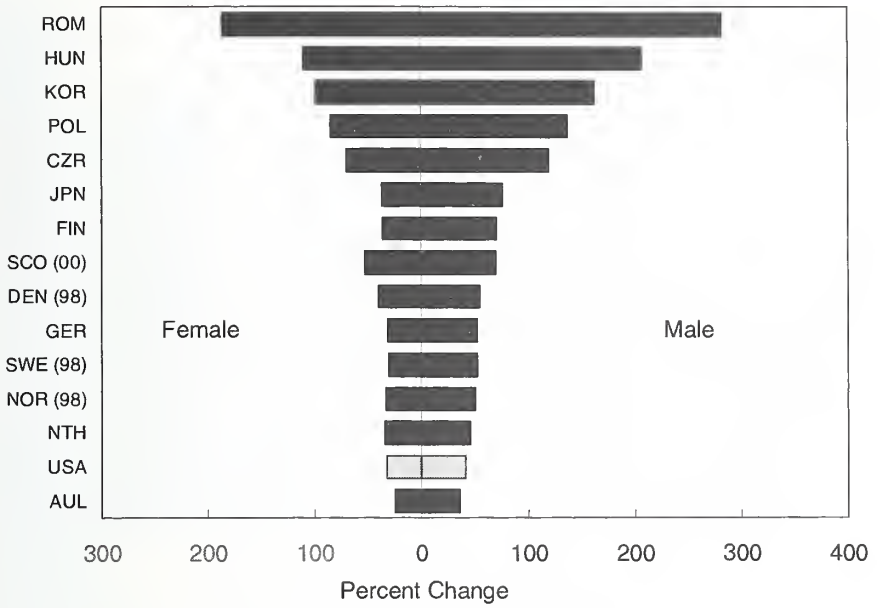
Chart 3–56
Age-Adjusted Death Rates for Stroke by State, U.S., 1996–98

In 1996–98, stroke mortality was highest in many of the southeastern States, most of which comprise "the stroke belt"; Indiana; and the northern Pacific States.[11]



Cerebrovascular Diseases (Stroke)

Chart 3–57
Age-Adjusted Death Rates* for Stroke
by Country and Sex, Ages 35–74, 1999†

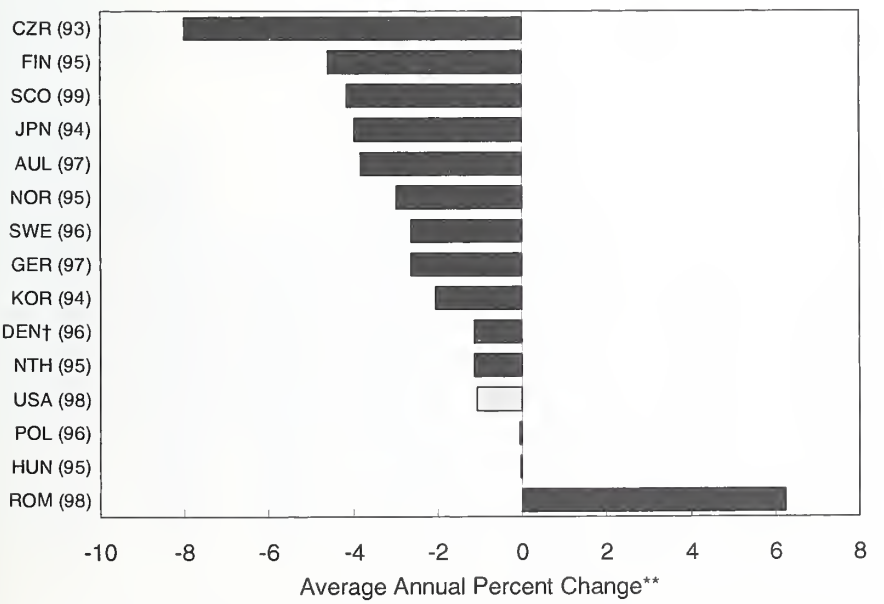


* Age-adjusted to the European standard.

† Data for 1999 unless otherwise noted in parentheses.

In 1999, among 15 industrialized countries, the United States had one of the lowest death rates for stroke. Eastern European countries and Korea had markedly higher rates compared with other countries. [8]

Chart 3–58
Change in Age-Adjusted Death Rates* for Stroke
in Males by Country, Ages 35–74, 1990–1999



* Age-adjusted to the European standard.

† Eighth revision of the ICD.

** Based on a log linear regression of the actual rates.

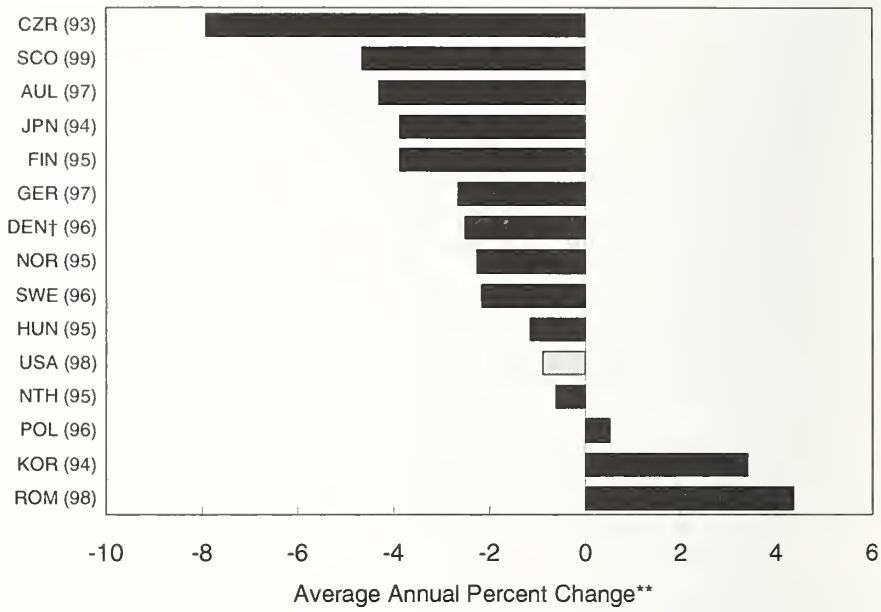
Note: The latest data years are indicated in parentheses.

Between 1990 and 1999, 11 countries had greater percent declines in stroke mortality for males than the United States.[8]

Cerebrovascular Diseases (Stroke)/Hypertension

Chart 3–59
Change in Age-Adjusted Death Rates* for Stroke in Females by Country, Ages 35–74, 1990–1999

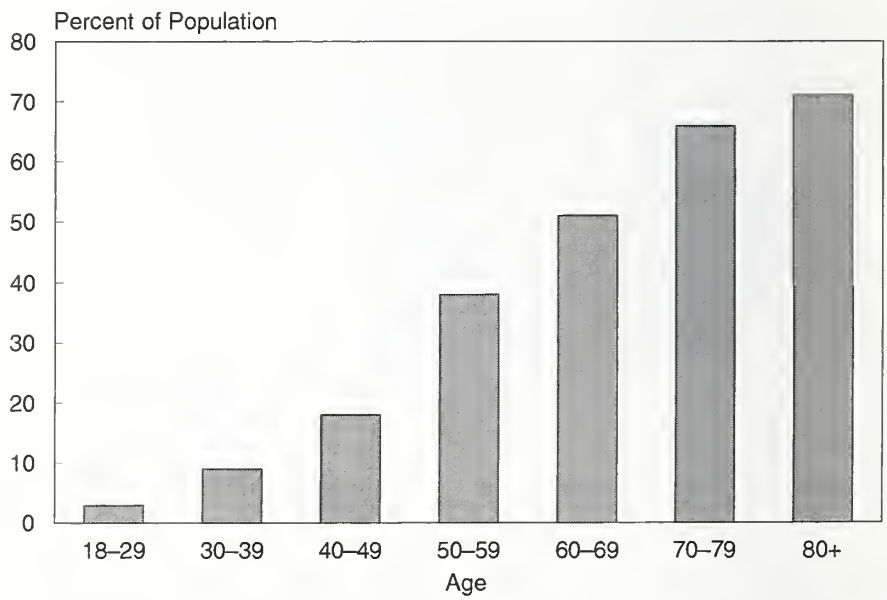
Between 1990 and 1999, 10 countries had greater percent declines in stroke mortality for females than the United States.[8]



* Age-adjusted to the European standard.
† Eighth revision of the ICD.
** Based on a log linear regression of the actual rates.
Note: The latest data years are indicated in parentheses.

Chart 3–60
Prevalence of Hypertension by Age, U.S., 1988–1994

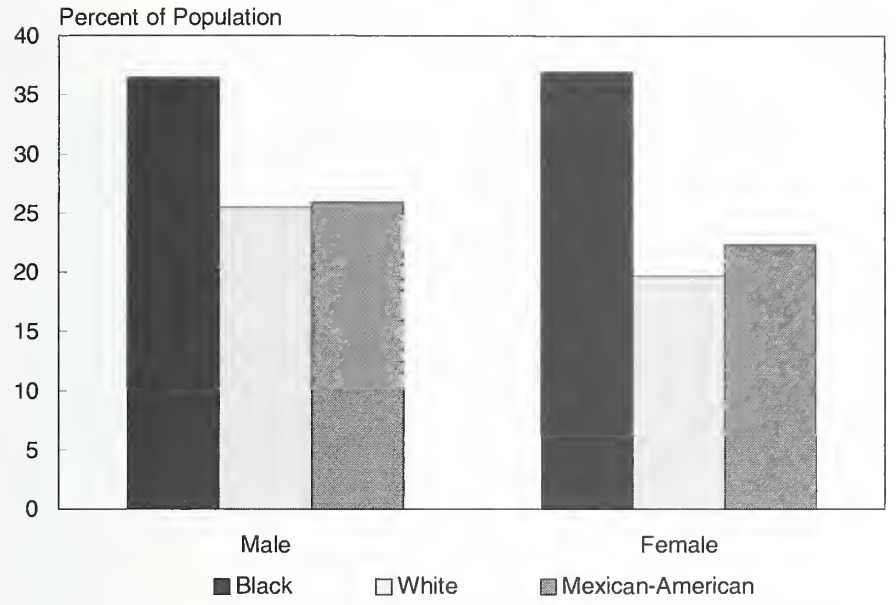
Between 1988 and 1994, the prevalence of hypertension was 38 percent at ages 50–59 and 71 percent at ages 80 and older.[14]



Note: Hypertension is defined as systolic BP 140+ mmHg, or 90+ diastolic BP, or on medication.

Hypertension

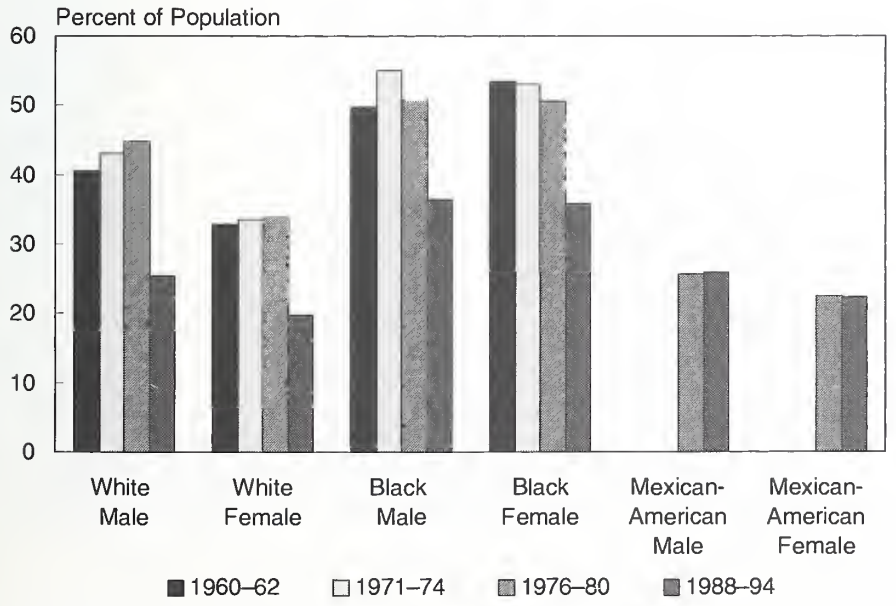
Chart 3–61
Prevalence of Hypertension by Race/Ethnicity and Sex, Ages 20–74, U.S., 1988–1994



Note: Hypertension is defined as systolic BP 140+ mmHg, or 90+ diastolic BP, or on medication.

Between 1988 and 1994, the prevalence of hypertension at ages 20–74 was appreciably higher in blacks than in whites or Mexican-Americans. Within race groups, it was higher in males than in females for whites and Mexican-Americans, but similar for black males and females.[27]

Chart 3–62
Prevalence* of Hypertension by Race/Ethnicity and Sex, Ages 20–74, U.S., 1960–62 to 1988–94



* Age-adjusted.

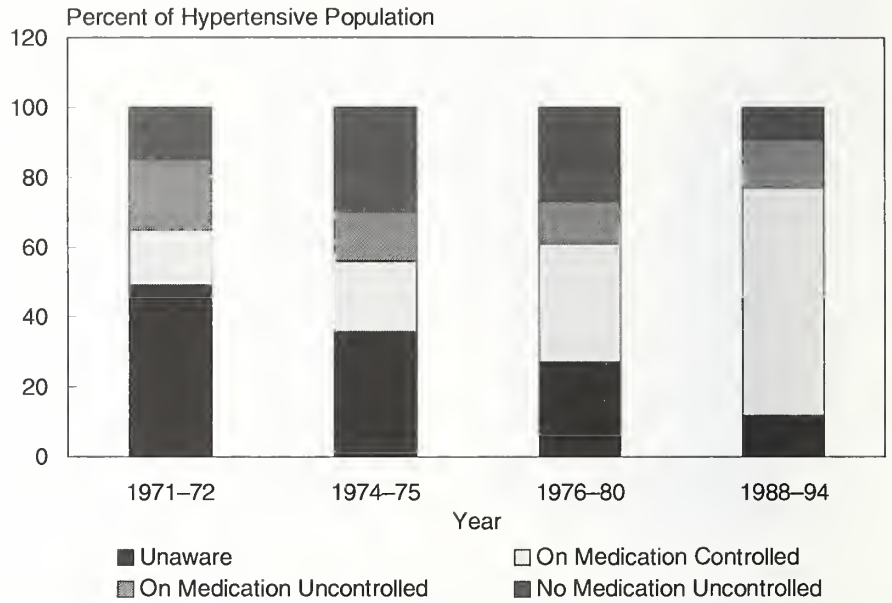
Note: Hypertension is defined as systolic BP 140+ mmHg, or 90+ diastolic BP, or on medication.

The prevalence of hypertension was appreciably lower in 1988–94 compared with earlier years for white and black males and females but not for Mexican-Americans, who had the lowest prevalence.[14]

Hypertension

Eighty-eight percent of persons with a high level of hypertension were aware of their condition in 1988–94 compared with 51 percent in 1971–72. The percent of hypertensive persons treated and controlled increased from 16 percent in 1971–72 to 65 percent in 1988–94.[14]

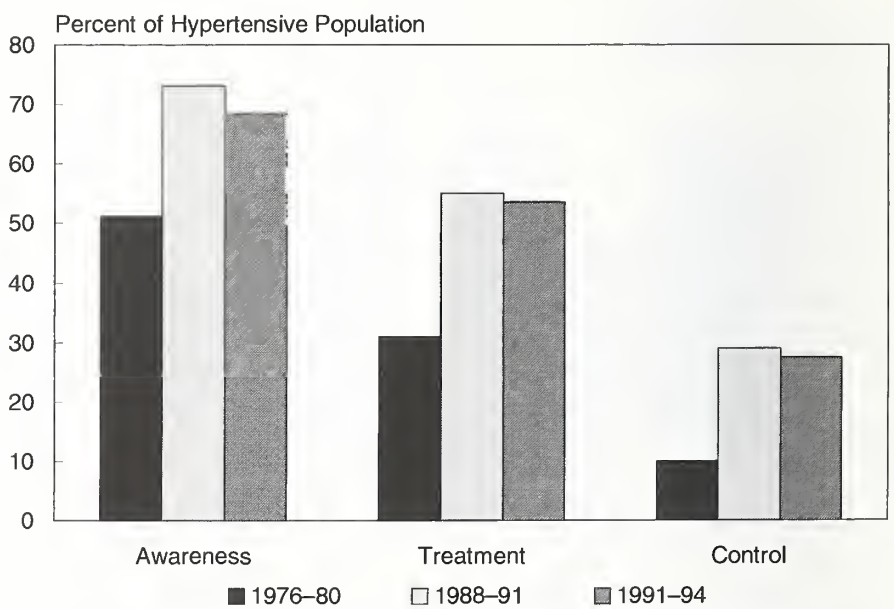
Chart 3–63
Hypertensive Population Aware, Treated, and Controlled, Ages 18–74, U.S., 1971–72 to 1988–94



Note: Hypertension is defined as systolic BP 160+ mmHg, or 95+ diastolic BP, or on medication.

In 1988–91, 73 percent of hypertensive patients were aware of their condition, 55 percent were receiving treatment for it, and 29 percent had it controlled. Those percentages were appreciably greater than the comparable figures for the 1976–80 period and remained relatively stable for 1991–94. [39]

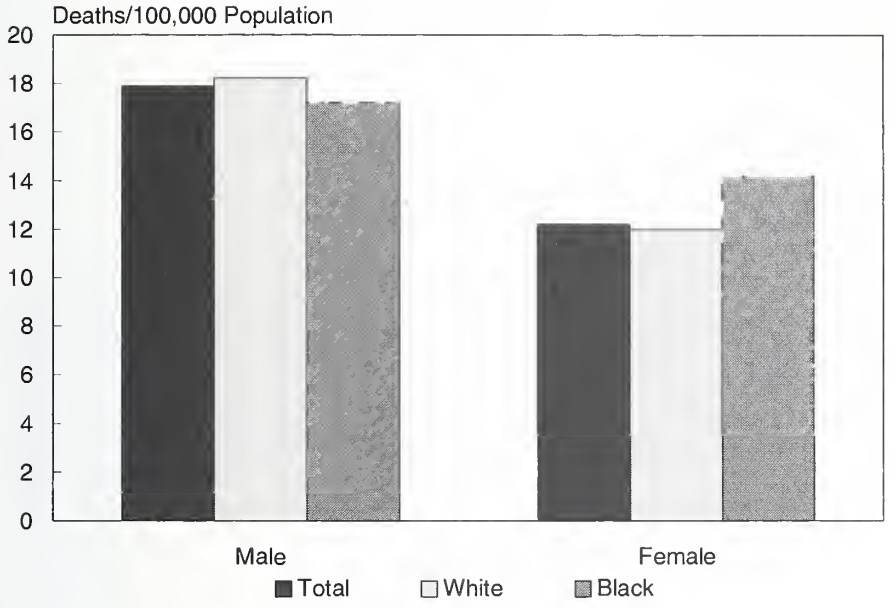
Chart 3–64
Hypertensive Population Aware, Treated, and Controlled, Ages 18–74, U.S., 1976–80, 1988–91, and 1991–94



Note: Hypertension is defined as systolic BP 140+ mmHg, or 90+ diastolic BP, or on medication.

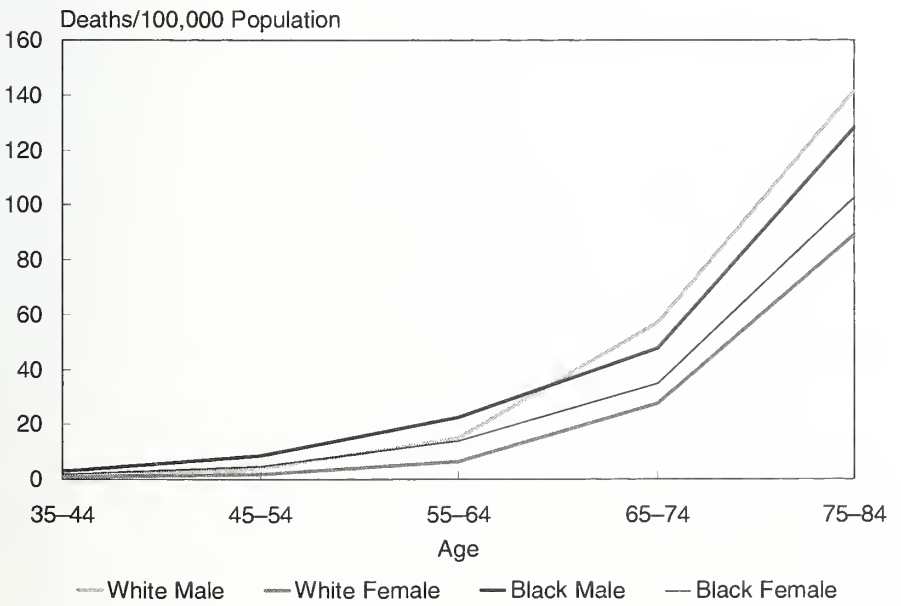
Diseases of Arteries

Chart 3–65
Age-Adjusted Death Rates for Diseases of Arteries by Race and Sex, U.S., 2000



In 2000, death rates for diseases of arteries were higher in males than in females, and about the same in blacks as in whites.[24, 26]

Chart 3–66
Death Rates for Diseases of Arteries by Age, Race, and Sex, U.S., 2000



In 2000, death rates for diseases of arteries within race groups were higher in males than in females at all ages. For females, they were higher in blacks than in whites at all ages, but only below age 65 were they higher in black males than in white males.[24, 26]

Congenital Anomalies of the Circulatory System

Chart 3–67
Percent of Deaths From Congenital Anomalies of the Circulatory System, Age <1, U.S., 1940–1999

The percentage of deaths from congenital anomalies of the circulatory system, younger than 1 year of age, declined from 82 percent in 1940 to 41 percent in 1999.[11, 23]

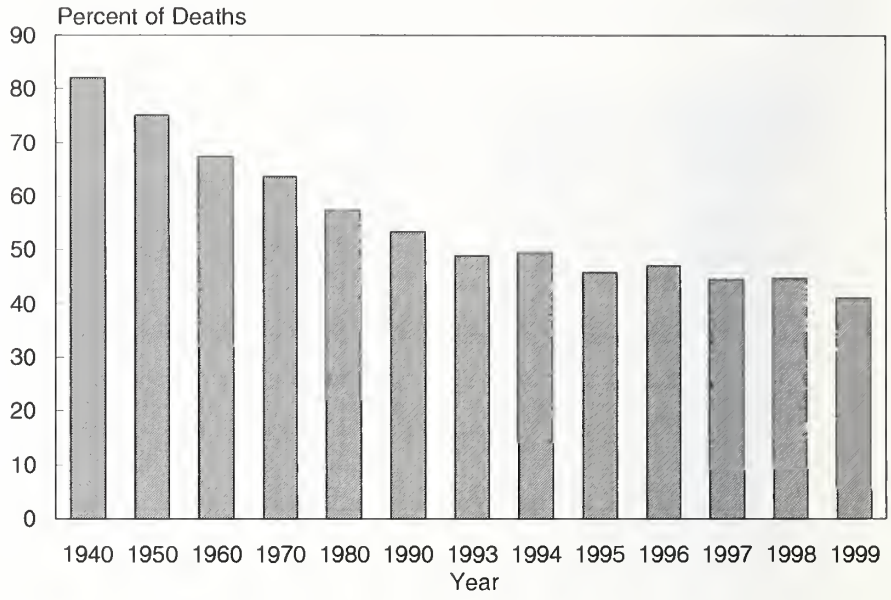
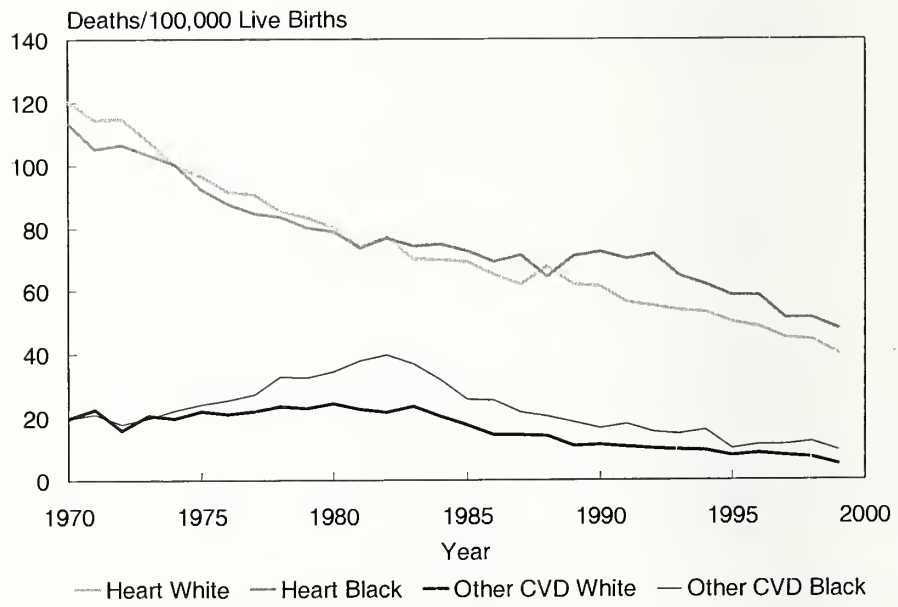


Chart 3–68
Infant Mortality From Congenital Anomalies of the Circulatory System by Race, U.S., 1970–1999

Infant congenital heart disease mortality declined in the 1970s and 1980s in blacks and in whites. For other congenital anomalies of the circulatory system, the trend has been downwards only since the early 1980s.[11, 23]



4. Lung Diseases

The term *lung diseases* is used here to mean:

- Acute lower respiratory infections
- Chronic lower respiratory diseases
- Lung diseases due to external agents
- Adult respiratory distress syndrome (RDS)
- Pulmonary edema
- Interstitial lung diseases
- Cardiopulmonary diseases
- HIV infections related to pulmonary disease
- Neonatal pulmonary diseases.

Chart 4–1 shows the distribution of deaths in 1999 by major lung subgroups. Chart 4–2 contains a detailed list of lung diseases; their 9th revision ICD codes; 1999 estimates of hospital discharges, length of stay, and physician office visits for the diagnostic codes; 10th revision ICD codes for lung diseases; and number of deaths in 1999 for those codes. Subsequent charts display morbidity and mortality for total lung diseases and specific subgroups—chronic bronchitis, emphysema, COPD, asthma, neonatal RDS, and sudden infant death syndrome (SIDS).

Chronic Obstructive Pulmonary Disease

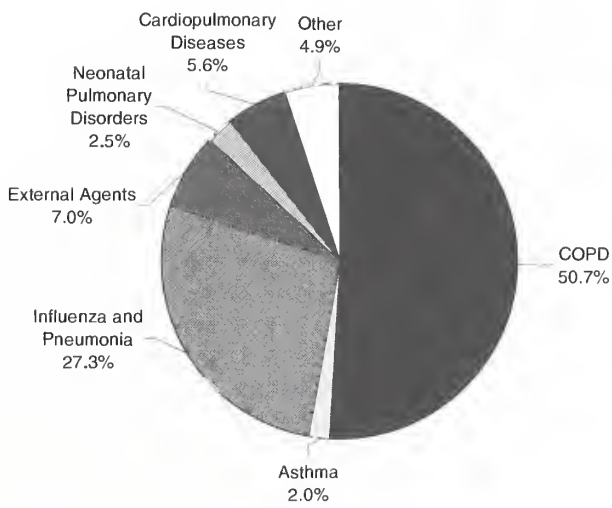
The term *COPD* includes chronic bronchitis and emphysema. In 1997, the survey used to determine the prevalence of chronic bronchitis and emphysema in the United States changed. Prior to 1997, prevalence was based on individuals who had, or knew someone in the family who had, chronic bronchitis or emphysema during the past 12 months. The new survey asks, "During the past 12 months, have you been told by a doctor or other health professional that you have chronic bronchitis? Have you ever been told by a doctor or other health professional that you have emphysema?" As a result, the 1997 to 2000 estimates are not comparable to those based on the NHIS of 1996 and earlier. A break in the prevalence trend lines between 1996 and 1997 in Charts 4–5 and 4–7 is used to indicate the discontinuity.

Asthma

Asthma mortality declined between 1968 and 1978, the period covered by the ICDA/8. In 1979, when the ninth revision was introduced, asthma mortality coincidently began to increase and the trend has been upward until at least 1996. How much of the increase is due to attention directed to the disease, leading to improved diagnosis, and/or changes in ICD coding is difficult to determine.

In 1997, the survey used to determine the prevalence of asthma in the United States changed. Prior to 1997, prevalence was based on NHIS estimates of individuals who had, or knew someone in the family who had, asthma during the past 12 months. The new survey estimates "asthma attack prevalence" by limiting the count to individuals who answer yes to the question, "During the past 12 months, have you had an episode of asthma or asthma attack?" As a result, the 1997 to 2000 estimates are not comparable to those based on the NHIS of 1996 and earlier. A break in the asthma prevalence trend line between 1996 and 1997 in Chart 4–18 is used to indicate the discontinuity.

Chart 4–1
Deaths From Lung Diseases, Percent by Subgroup, U.S., 1999



Total Deaths = 233,659 (100%)

Lung Diseases

Chart 4–2
Number of Hospitalizations, Physician Office Visits, and Deaths for Selected Lung Diseases, U.S., 1999

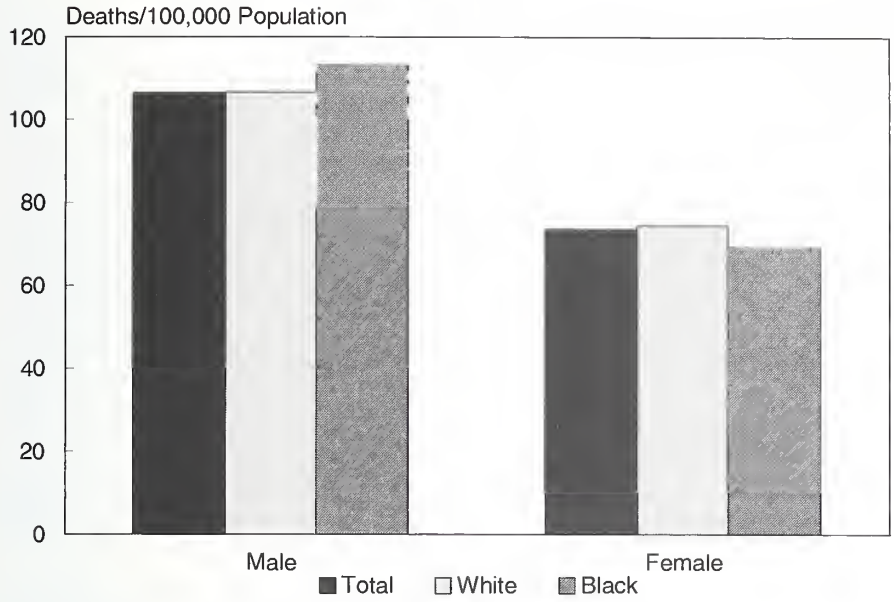
Diagnostic Category	ICD/9 Codes	Hospitalizations: First-Listed Discharge (1,000)	Hospitalizations: Length of Stay (Days)	Physician Office Visits (1,000)	ICD/10 Codes	Deaths
Total		3,491	5.7	31,440		233,659
Acute lower respiratory infections						
Influenza and pneumonia	480–487	1,416	6.0	5,966	J10–J18	63,730
Acute bronchitis	466	298	3.3	2,640	J20	304
Acute bronchiolitis	included in 466	–	–	–	J21	84
Chronic lower respiratory disease						
COPD	490–492, 494–496	713	5.1	12,345	J40–J44	118,554
Chronic bronchitis	490, 491	567	5.1	8,643	J40–J42	1,172
Emphysema	492	24	5.1	208	J43	17,787
Other COPD	495–496	122	4.7	3494	J44	99,595
Bronchiectasis	494	6	6.0	45	J47	970
Asthma	493	478	3.2	9,498	J45	4,172
Status asthmaticus	included in 493				J46	485
Cystic fibrosis	277.0	12	10.0	–	E84	485
Lung disease due to external agents	500–508	170	9.0	–	J60–J70	16,471
Adult respiratory distress syndrome	518.5	–	–	–	J80	2,125
Pulmonary edema	518.4	7	3.6	–	J81	746
Interstitial lung diseases:						
Sarcoidosis	135	6	6.3	130	D86	572
Respiratory tuberculosis	011, 012	7	10.3	148	A15, A16, A19, A31.0	997
Respiratory failure	518.8	206	10.3	163	J96	3,597
Pulmonary manifestations of connective tissue disorders	446.2, 446.4	–	–	113	J99, M31.0, M31.3	414
Cardiopulmonary diseases:						
Pulmonary embolism	415.1	90	7.5	92	I26	9,008
Other pulmonary heart disease	415.2–417	13	5.7	15	I27	4,172
Selected HIV-related and other pulmonary infections	114–116, 117.3, 117.5, 117.7, 136.3	5	13.6	47	B38–40, B44–46, B59	959
Neonatal pulmonary disorders						
RDS	769	17	22.6	–	P22.0	1,024
SIDS	798.0	–	–	–	R95	2,648
Congenital malformation of the lung	745.4, 745.5, 745.6	15	–	238	Q33	545
Bronchopulmonary dysplasia	770.7	–	–	–	P27.1	335
Atelectasis of newborn	770.4, 770.5	–	–	–	P28.0, P28.1	647
Other perinatal respiratory diseases	770.1–770.3, 770.6, 770.8, 770.9	32	–	–	P25, P26, P27.0, P27.8, P27.9, P28.2–P28.9	615

Note: Estimates of hospitalizations and physician office visits are subject to sampling variability. Estimates of hospitalizations 15,000 or below have a relative standard error of more than 16 percent. Estimates of physician office visits below 1 million have a relative standard error of more than 30 percent.

Compiled from references 11, 28, and 32.

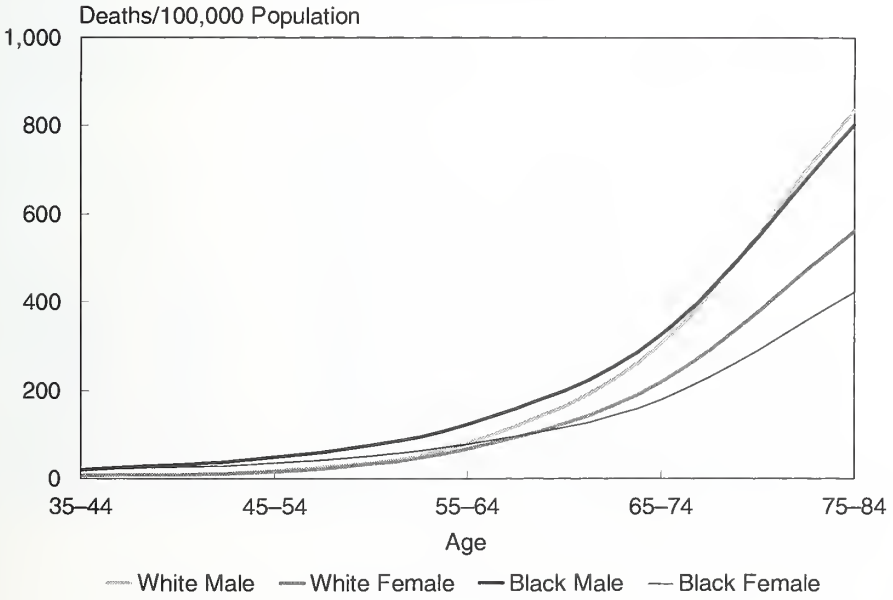
Lung Diseases

Chart 4–3
Age-Adjusted Death Rates for Total Lung Diseases by Race and Sex, U.S., 1999



In 1999, total lung disease mortality (other than lung cancer) was higher in males than in females. It was not markedly different between blacks and whites.[11, 25]

Chart 4–4
Death Rates for Total Lung Diseases by Age, Race, and Sex, U.S., 1999

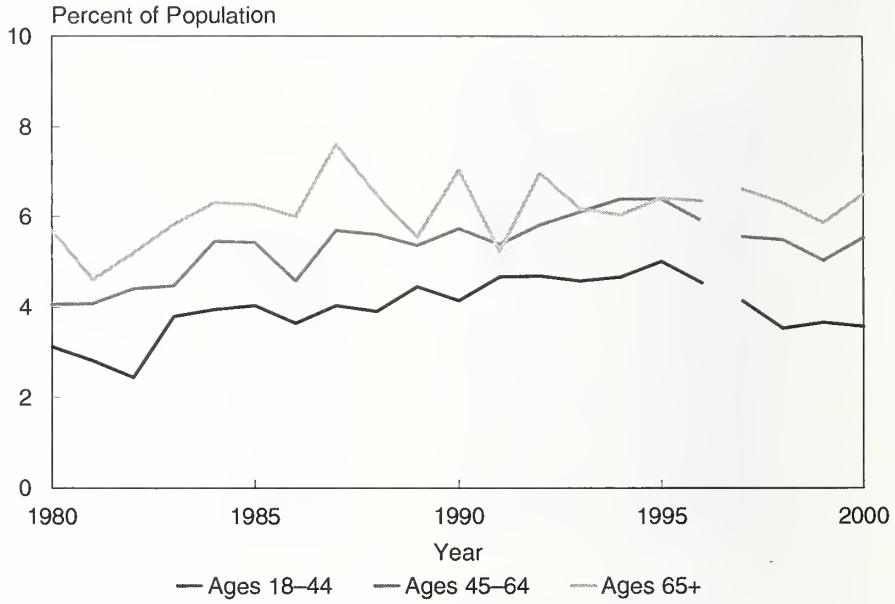


In 1999, the male-female gap in mortality from total lung diseases increased for blacks and whites with increasing age.[11, 25]

Chronic Obstructive Pulmonary Disease

Chart 4–5
Prevalence of Chronic Bronchitis
by Age, U.S., 1980–2000

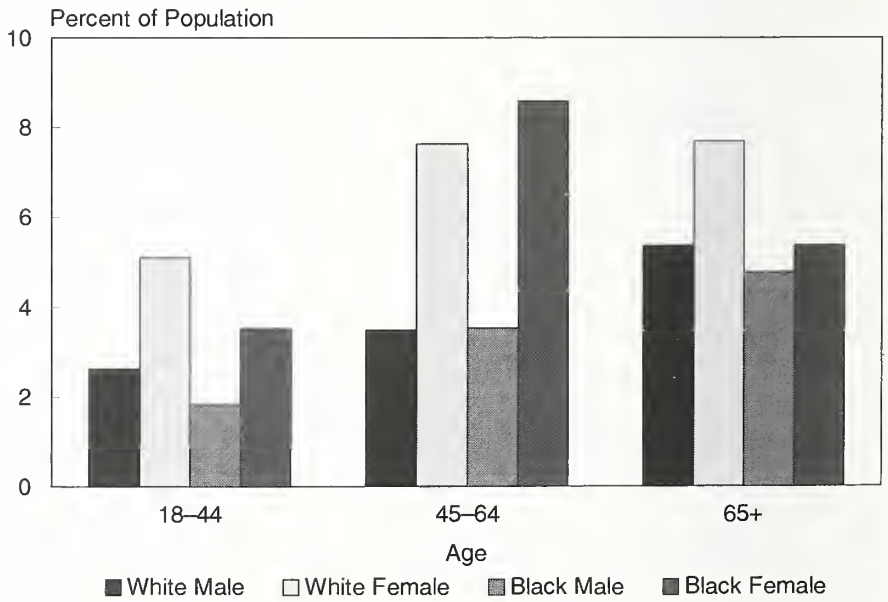
The prevalence of chronic bronchitis increased from 1980 to 1995. No clear trend was apparent between 1997 and 2000.[15, 20, 40]



Note: Discontinuity between 1996 and 1997 is due to change in the question used to determine prevalence.

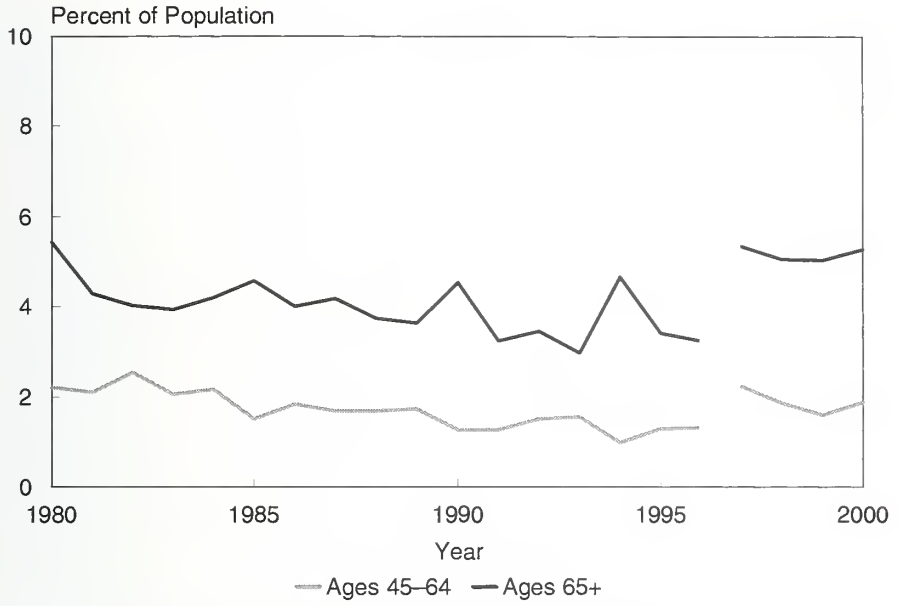
Chart 4–6
Prevalence of Chronic Bronchitis
by Age, Sex, and Race, U.S., 2000

In 2000, the prevalence of chronic bronchitis was higher in females than in males for all age groups. It was higher for whites than for blacks, ages 18–44 and 65 and older, slightly higher for black females than white females, ages 45–64.[20]



Chronic Obstructive Pulmonary Disease

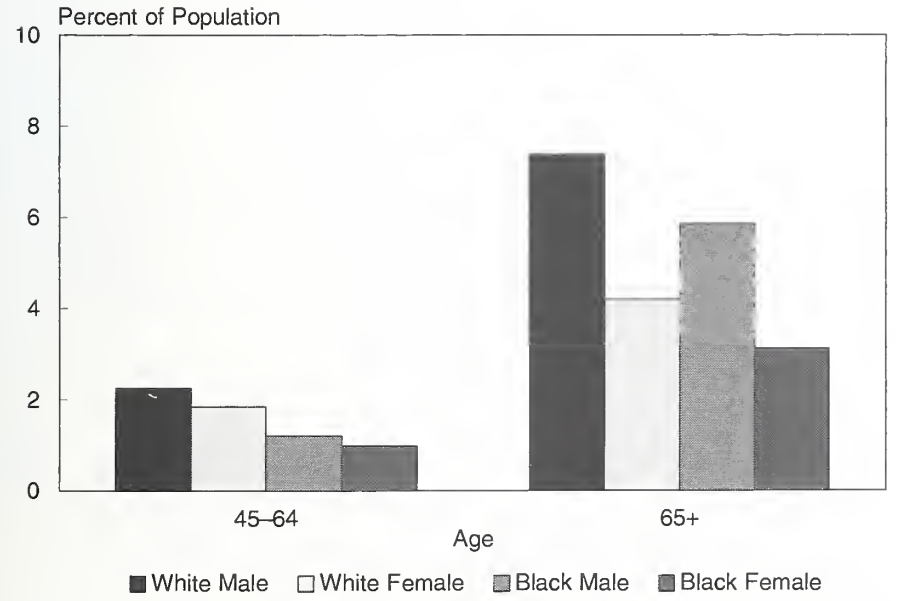
Chart 4–7
Prevalence of Emphysema by Age, U.S., 1980–2000



Note: Discontinuity between 1996 and 1997 is due to change in the question used to determine prevalence.

The prevalence of emphysema declined from 1980 to 1996. No clear trend was apparent between 1997 and 2000.[15, 20, 40]

Chart 4–8
Prevalence of Emphysema by Sex and Race, Ages 45–64 and 65+, U.S., 2000



In 2000, the prevalence of emphysema for males and females was higher in whites than in blacks. For blacks and whites, it was higher in males than in females; the difference was small for black males and females ages 45–64.[20]

Chronic Obstructive Pulmonary Disease

Chart 4–9
Hospitalization Rates for Chronic Obstructive Pulmonary Disease, Ages 45–64 and 65+, U.S., 1970–2000

Between 1970 and 2000, COPD hospitalization rates varied considerably.[28–29]

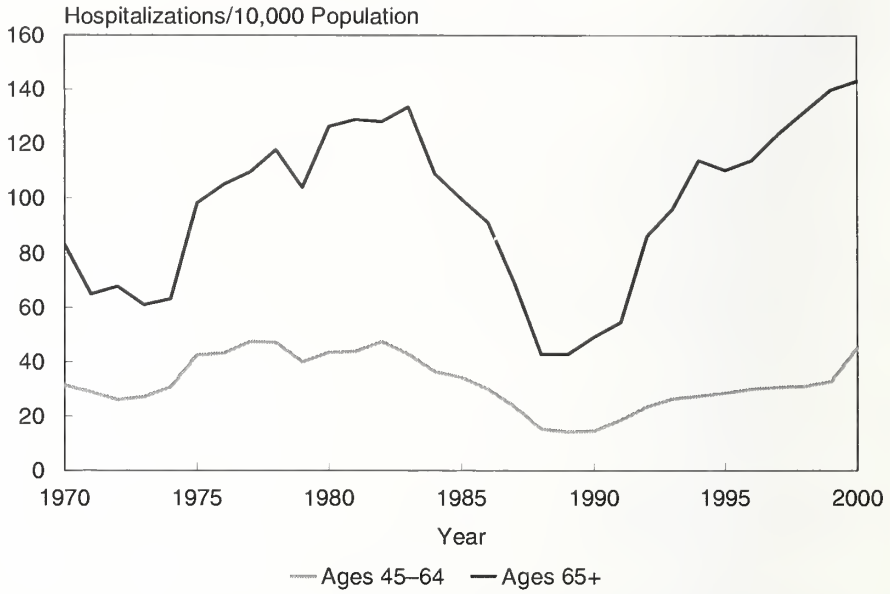
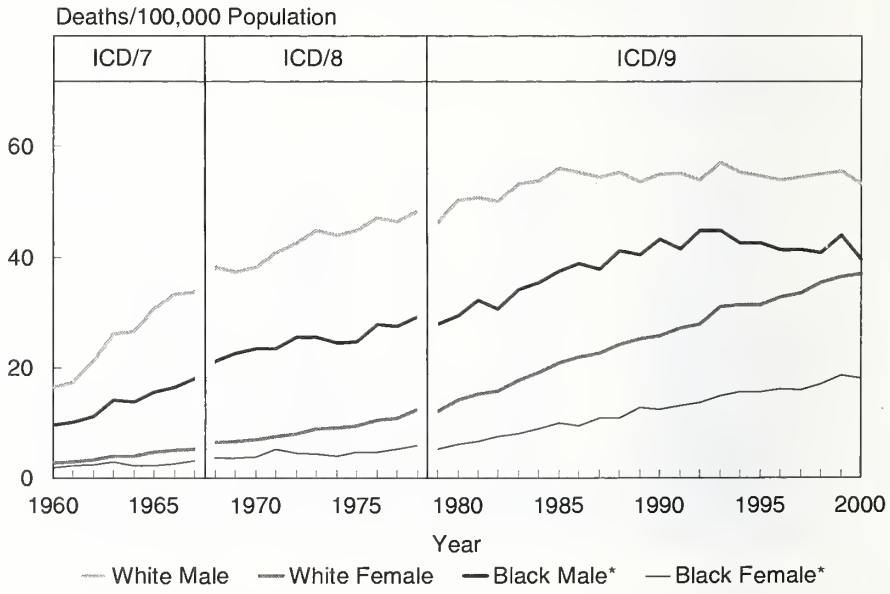


Chart 4–10
Age-Adjusted Death Rates for Chronic Obstructive Pulmonary Disease by Race and Sex, U.S., 1960–2000

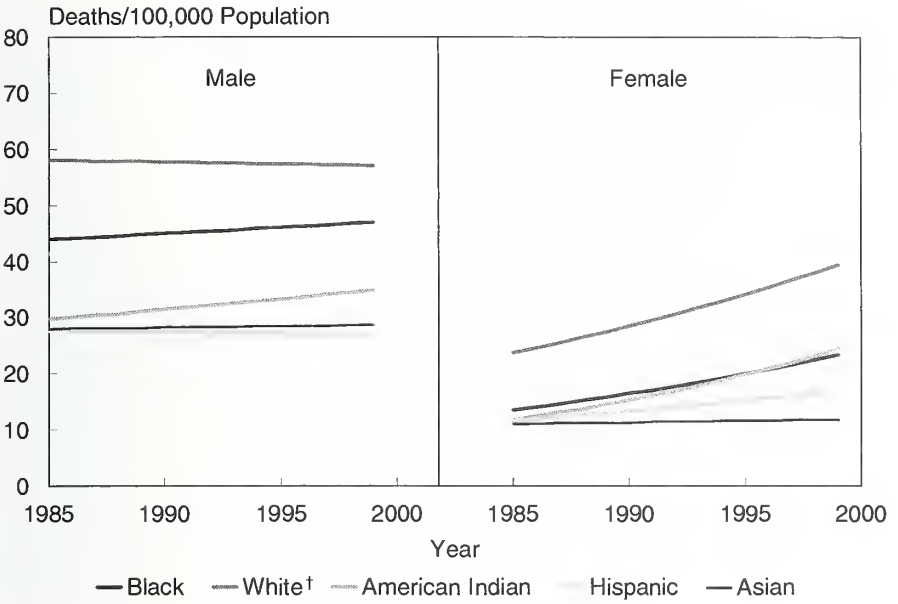
COPD mortality, though highest in white males, remained relatively constant for them since the early 1980s. During the same period, it gradually increased in black males, but doubled in black females and in white females.[11, 22–26, 41]



* Nonwhite from 1960 to 1967.

Chronic Obstructive Pulmonary Disease

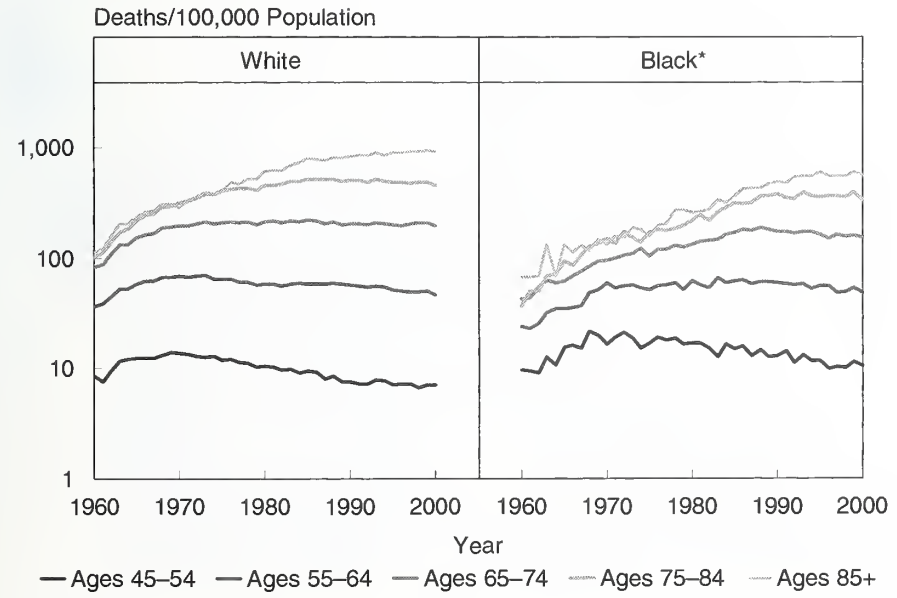
Chart 4–11
Age-Adjusted Death Rates for Chronic Obstructive Pulmonary Disease* by Race/Ethnicity and Sex, U.S., 1985–1999



* COPD and allied conditions.
† Non-Hispanic.
Note: Each line is a log-linear regression derived from the actual rates.

Between 1985 and 1999, COPD mortality (including asthma) increased substantially in women of various racial and ethnic groups, particularly in whites, but modestly in Asians. In males, it increased for blacks and American Indians, but declined modestly in whites, Hispanics, and Asians. In both males and females the highest rates are in whites followed by blacks.[27]

Chart 4–12
Death Rates for Chronic Obstructive Pulmonary Disease in Males by Age and Race, U.S., 1960–2000



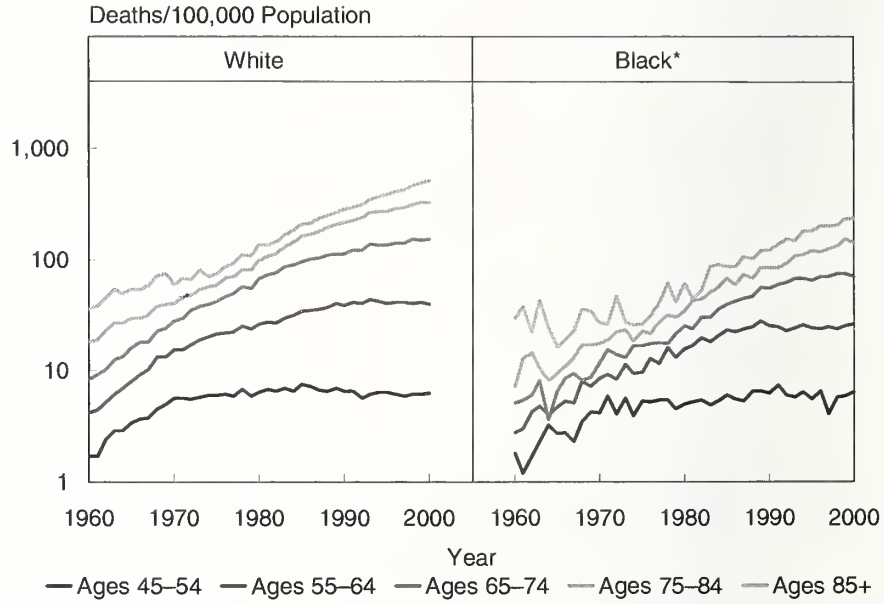
* Nonwhite from 1960 to 1967.

After initial increases in the 1960s, COPD death rates declined in white males and in black males ages 45–54 and 55–64, became relatively stable for white males at ages 65–74, and continued to increase for those ages 75 and older.[11, 22–26, 41]

Chronic Obstructive Pulmonary Disease

Since 1960, COPD death rates have increased in white females and in black females at all ages. For the last several years, however, the rates have been relatively stable among those in the younger age range, but continued to increase among those in older age ranges.[11, 22–26, 41]

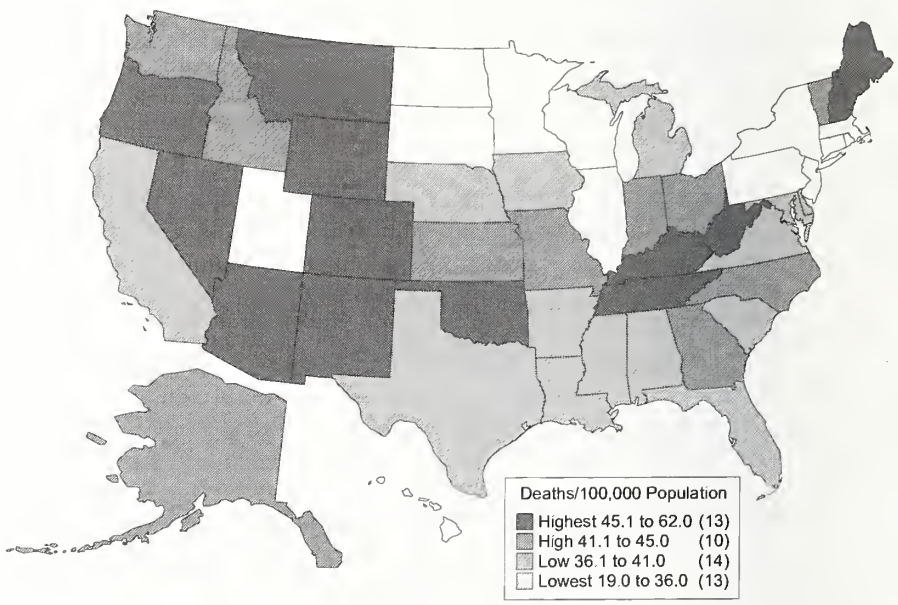
Chart 4–13
Death Rates for Chronic Obstructive Pulmonary Disease in Females by Age and Race, U.S., 1960–2000



* Nonwhite from 1960 to 1967.

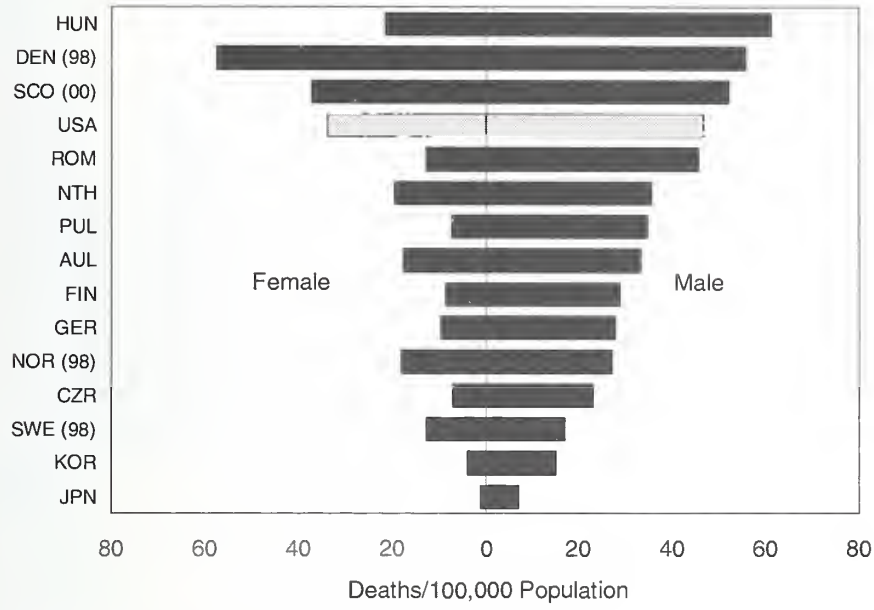
In 1996–98, COPD mortality tended to be highest in the western Mountain States.[11, 22–26]

Chart 4–14
Age-Adjusted Death Rates for Chronic Obstructive Pulmonary Disease by State, U.S., 1996–98



Chronic Obstructive Pulmonary Disease

Chart 4–15
Age-Adjusted Death Rates* for Chronic Obstructive Pulmonary Disease by Country and Sex, Ages 35–74, 1999†

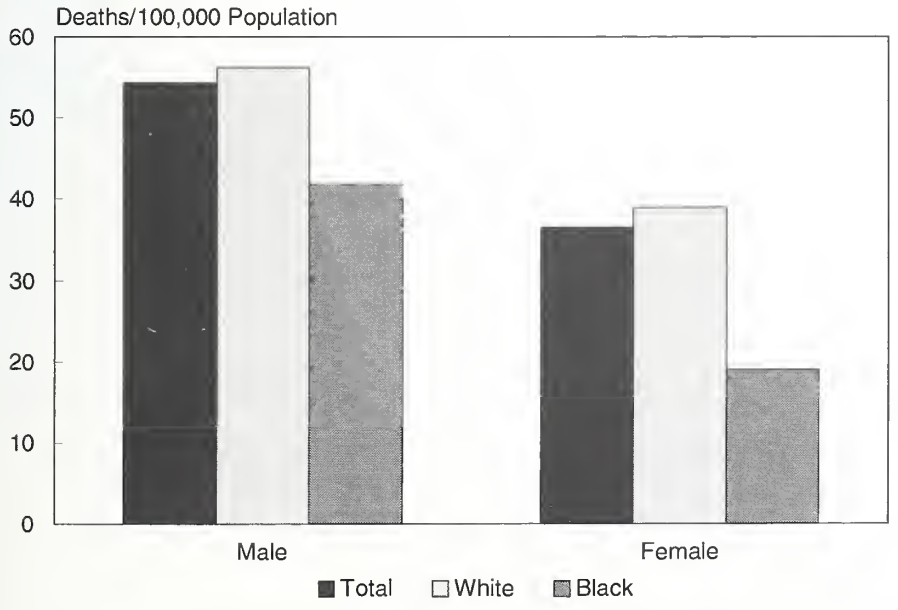


* Age-adjusted to European standard.

† Data for 1999 unless otherwise noted in parentheses.

Among 15 industrialized countries, the United States ranked third in COPD mortality for females and fourth for males in 1999.[8]

Chart 4–16
Age-Adjusted Death Rates for Chronic Obstructive Pulmonary Disease by Race and Sex, U.S., 2000



In 2000, COPD mortality was higher in males than in females. For males, it was one-third higher in whites than in blacks, and for females, it was two times higher in whites than in blacks.[24, 26]

Chronic Obstructive Pulmonary Disease/Asthma

Chart 4–17
Death Rates for Chronic Obstructive Pulmonary Disease by Age, Race, and Sex, U.S., 2000

In 2000, COPD mortality increased significantly with age for all race and sex groups. It was highest in white males ages 65 and older and lowest in black females ages 55 and older.[24, 26]

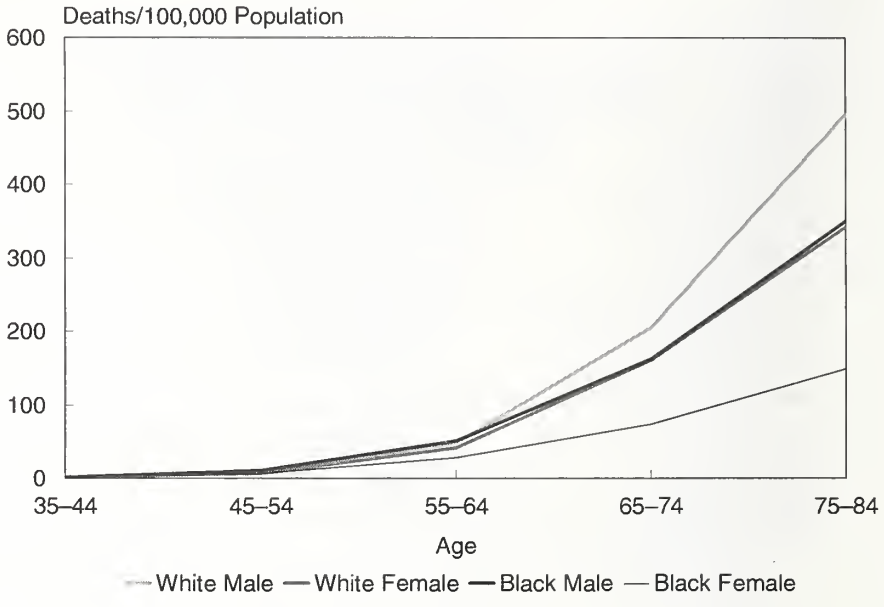
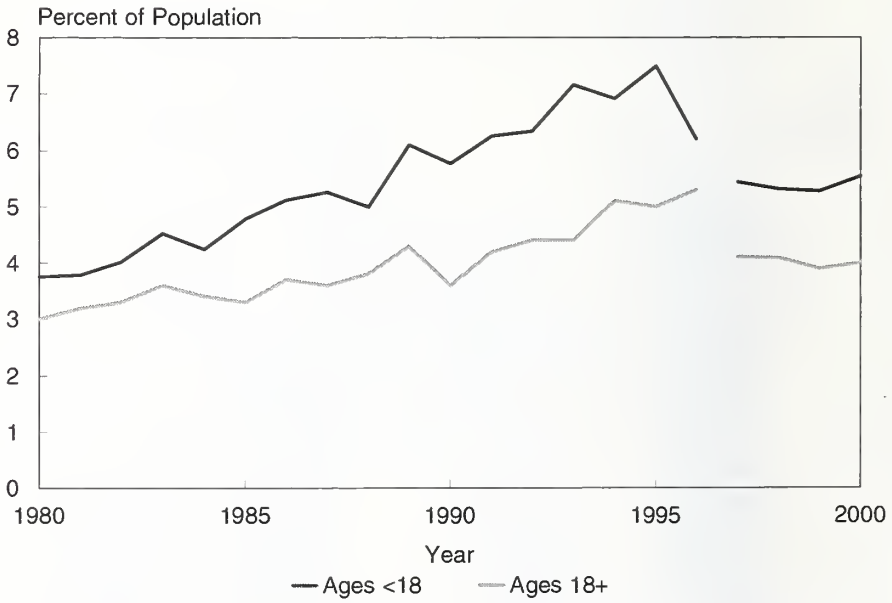


Chart 4–18
Prevalence of Asthma Ages <18 and 18+, U.S., 1980 to 2000

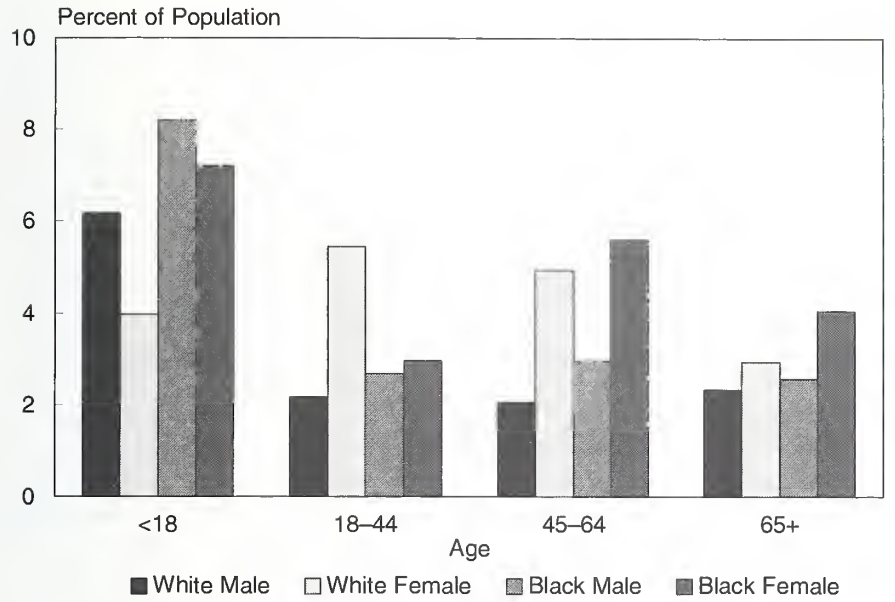
Between 1980 and the mid-1990s, the prevalence of asthma increased; from 1997 to 2000, asthma attack prevalence remained relatively stable.[20, 40]



Note: Discontinuity between 1996 and 1997 is due to change in the question used to determine prevalence.

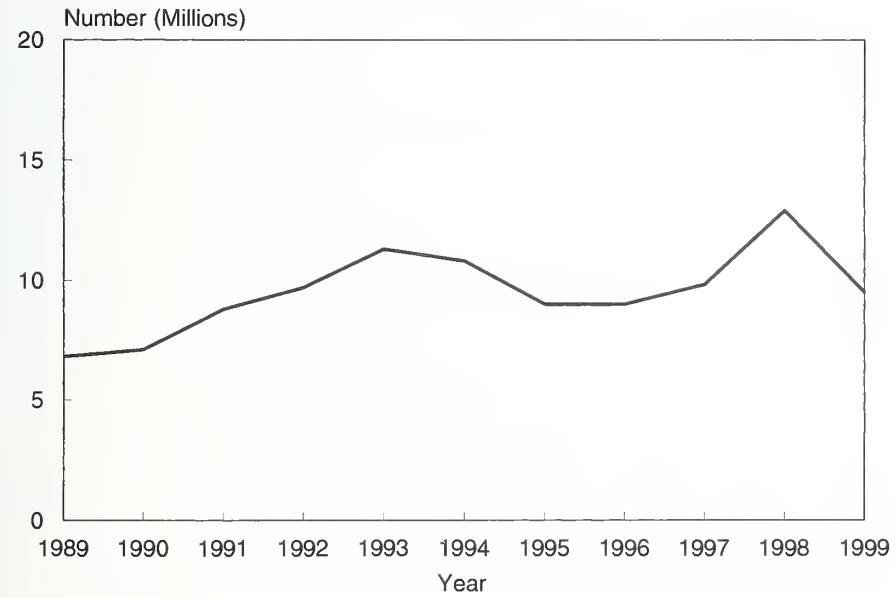
Asthma

Chart 4–19
Asthma Attack Prevalence by Age, Sex, and Race, U.S., 2000



In 2000, asthma attack prevalence within racial groups was higher for females than for males ages 18 and older; for those younger than 18, it was higher for males than for females. Within sex groups, the prevalence was higher in blacks than in whites for each age group except for ages 18–44, where it was higher in white females than in black females.[20]

Chart 4–20
Physician Office Visits for Asthma, U.S., 1989–1999



Between 1989 and 1999, the number of physician office visits for asthma has increased.[30]

Asthma

Chart 4–21
Hospitalizations for Asthma,
U.S., 1980–2000

Hospitalizations with asthma as the primary diagnosis remained relatively stable between 1980 and 2000; hospitalizations with asthma as a secondary diagnosis, however, increased significantly during the 1990s.[28–29]

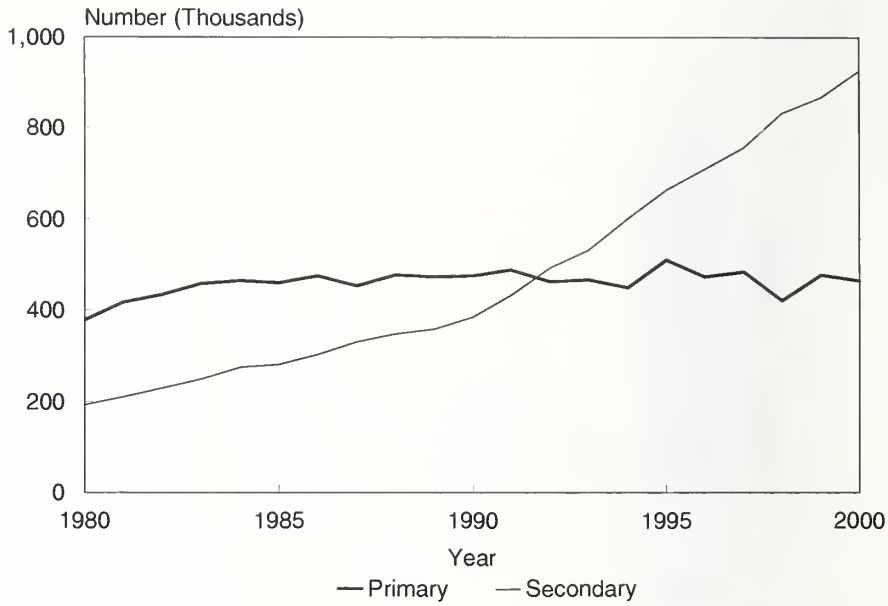
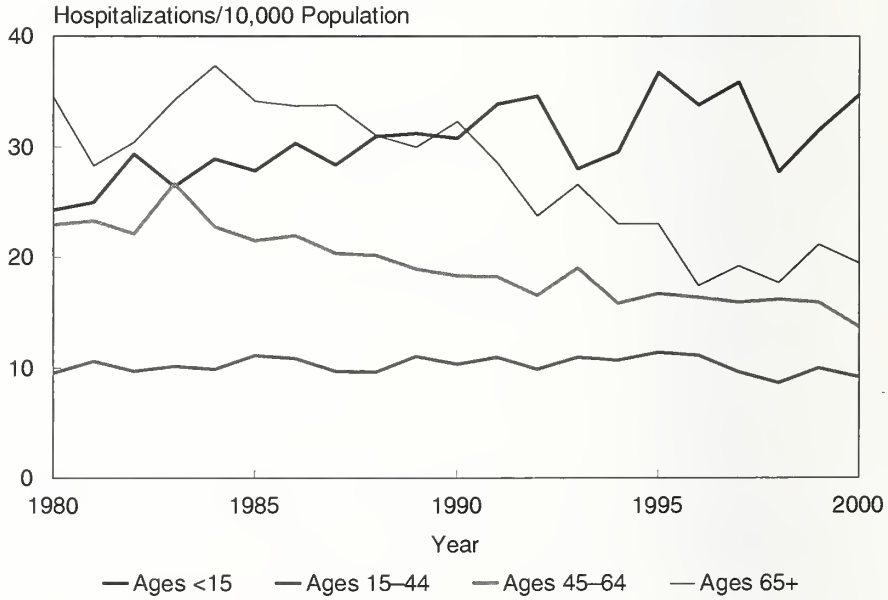


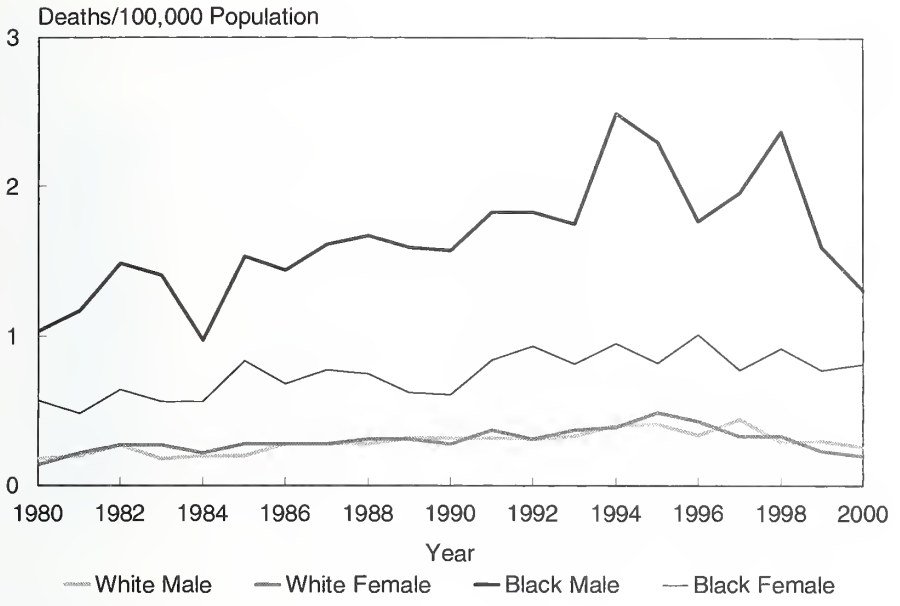
Chart 4–22
Hospitalization Rates for Asthma
by Age U.S., 1980–2000

From 1980 to 2000, hospitalization rates for asthma in the 15–44 age group were the lowest of the four age groups; since 1991, they were highest in the younger than 15 age group. For those 45 and older, the rates have been decreasing since the mid-1980s.[28–29]



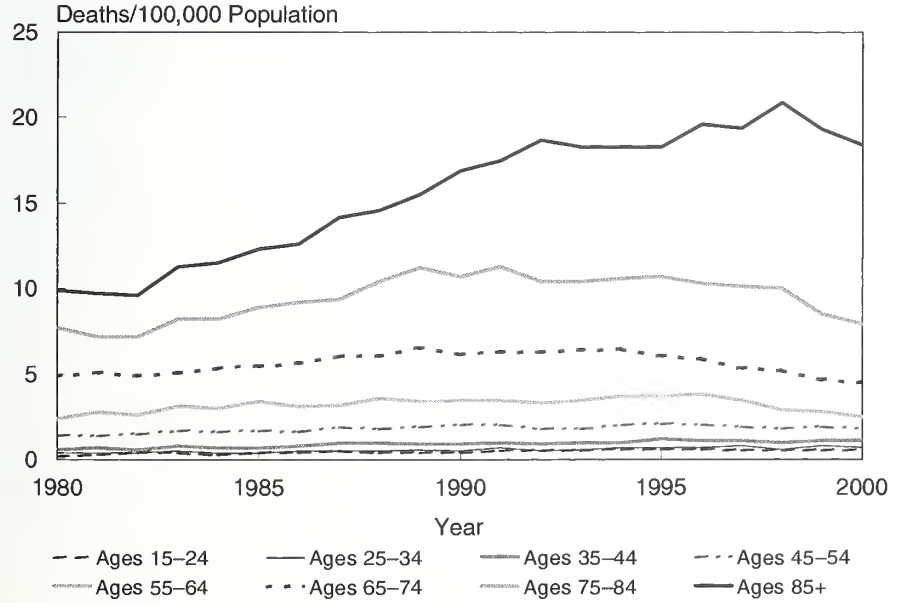
Asthma

Chart 4–23
Age-Adjusted Death Rates for Asthma by Race and Sex, Ages 1–24, U.S., 1980–2000



Although asthma mortality fluctuated between 1980 and 2000, it tended to increase for each race/sex group, ages 1–24.[11, 22–26]

Chart 4–24
Death Rates for Asthma by Age, U.S., 1980–2000



During the 1980s, asthma mortality increased for all ages; it remained relatively constant during the 1990s for most age groups. The rates for age groups 55–54, 65–74, 65–74, and 75–84 began to decrease in the late 1990s.[11, 22–26]

Asthma

Chart 4–25
Age-Adjusted Death Rates for Asthma
by Race and Sex, U.S., 2000

In 2000, asthma mortality was 3 times higher in black males than in white males, more than 2.5 times higher in black females than in white females, and 42 percent higher overall in females than in males.[24, 26]

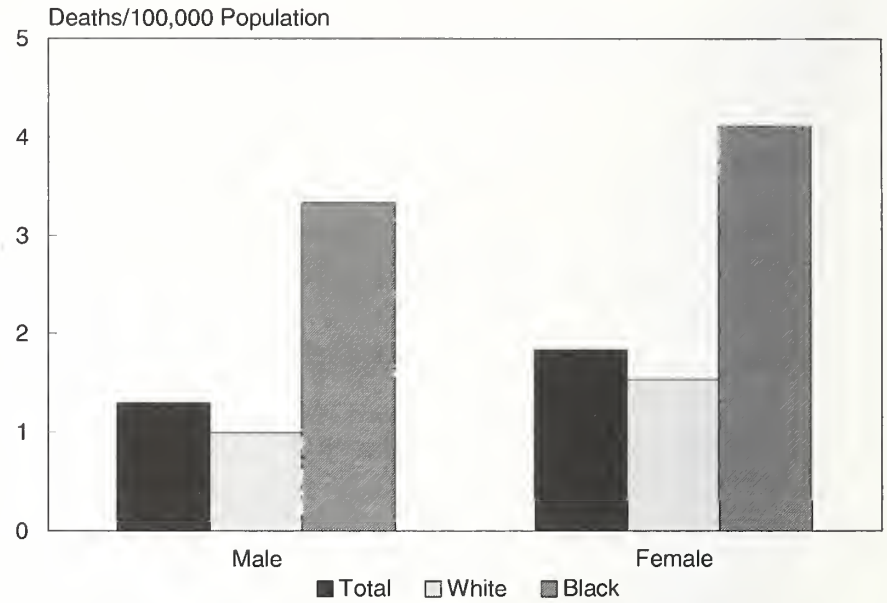
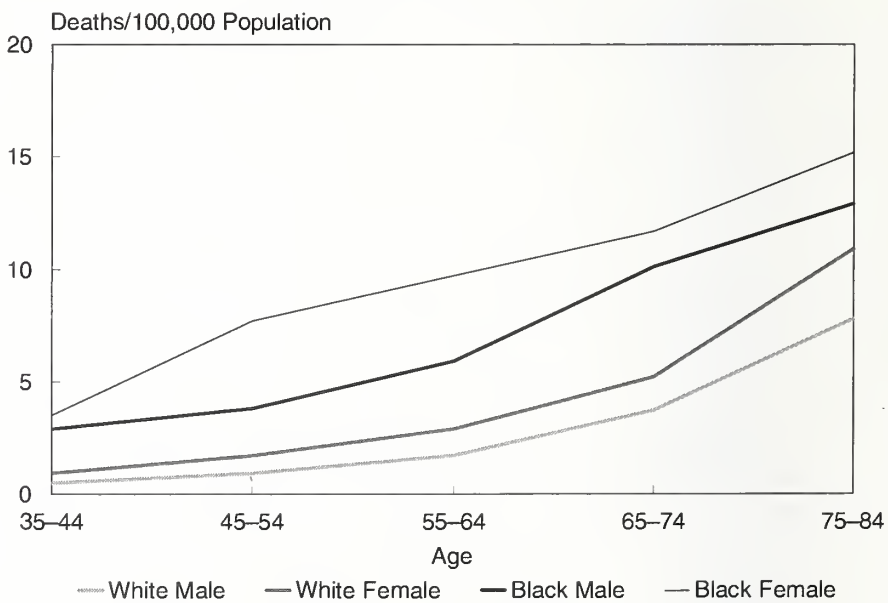


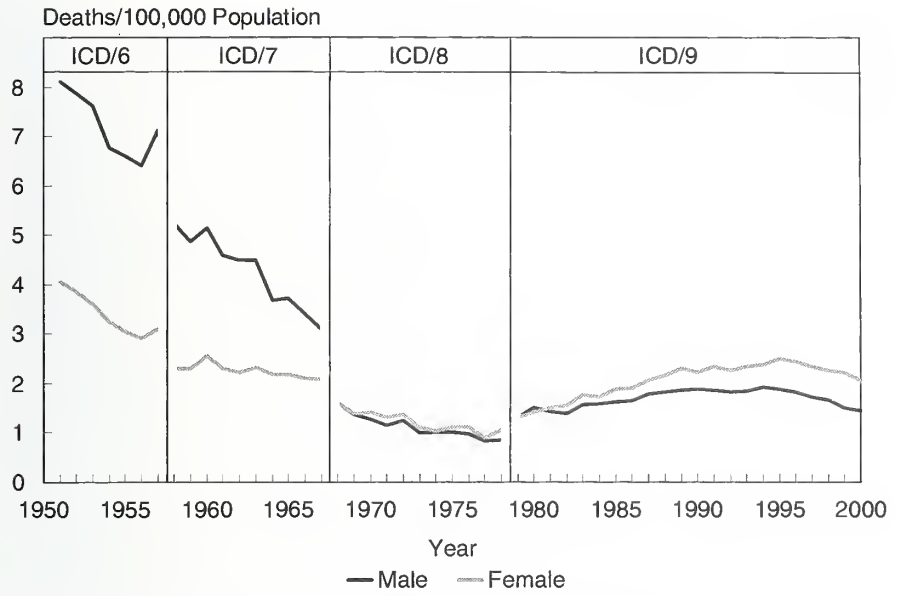
Chart 4–26
Death Rates for Asthma
by Age, Race, and Sex, U.S., 2000

In 2000, asthma mortality was much higher in blacks than in whites at each age. Within both race groups, it was higher in females than in males.[24, 26]



Asthma

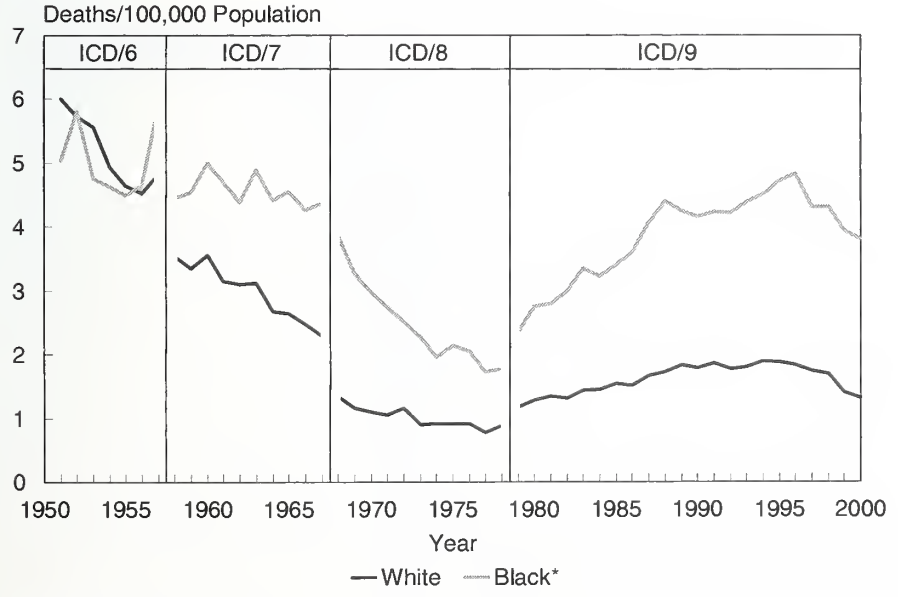
Chart 4–27
Age-Adjusted Death Rates for Asthma
by Sex, U.S., 1951–2000



Note: Sudden changes in the rates are most likely due to revisions to the ICD.

Asthma mortality declined from 1950 to 1978 and then began to increase. Rates were much higher in males than in females before the late-1960s, but then became higher in females than in males.[11, 22–26]

Chart 4–28
Age-Adjusted Death Rates for Asthma
by Race, U.S., 1951–2000



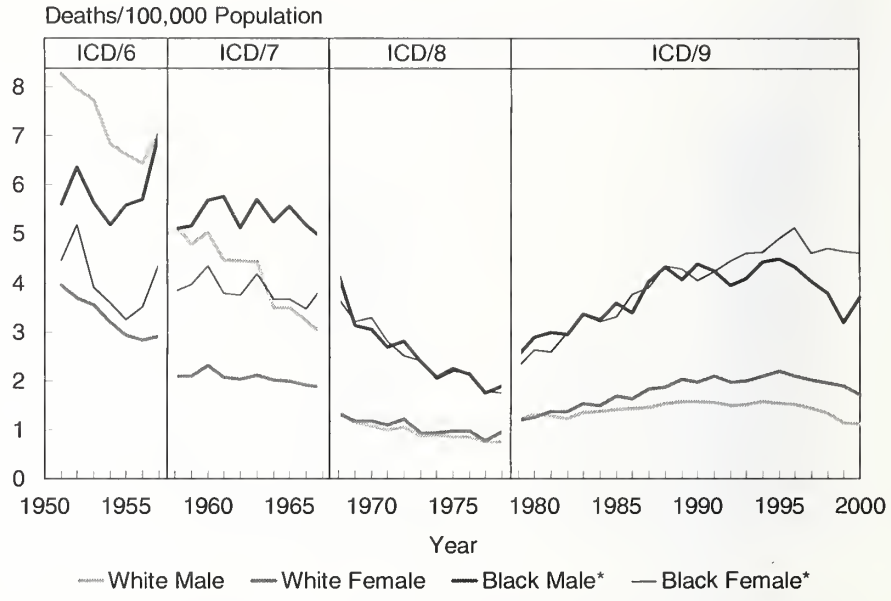
* Nonwhite from 1951 to 1967.
Note: Sudden changes in the rates are most likely due to revisions to the ICD.

Between 1978 and 2000, the black-white gap in asthma mortality increased, with the rate being much higher in blacks than in whites.[11, 22–26]

Asthma

Trends in asthma mortality have been much more similar for males and females within race groups since 1970. The rates, however, have been higher for blacks than for whites.[11, 22–26]

Chart 4–29
Age-Adjusted Death Rates for Asthma by Race and Sex, U.S., 1951–2000



* Nonwhite from 1950 to 1967.
Note: Sudden changes in the rates are most likely due to revisions to the ICD.

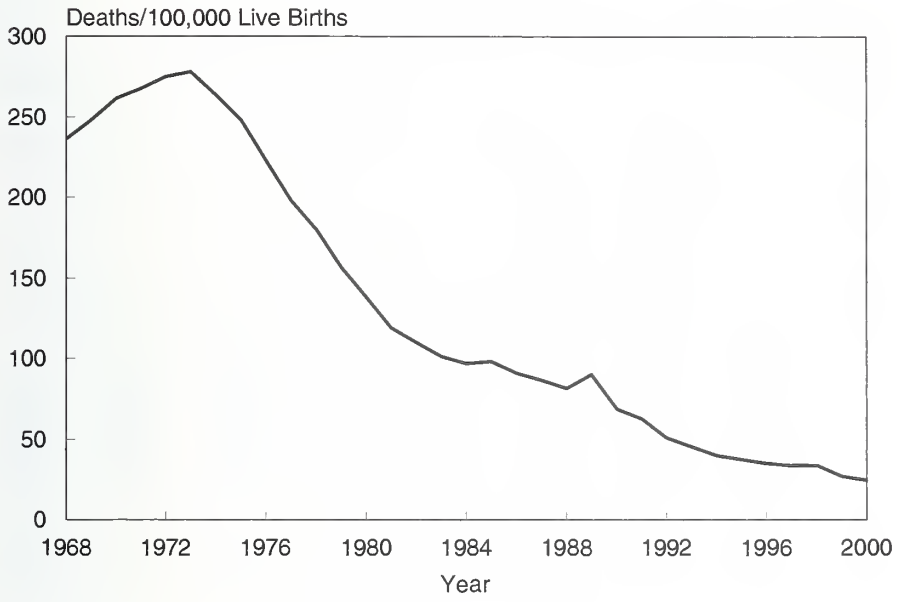
In 1999, among 15 countries, asthma mortality ranked 13th for males and 10th for females.[8]

Chart 4–30
Age-Adjusted Death Rates* for Asthma by Country and Sex, 1999†

* Age-adjusted to European standard.
† Data for 1999 unless otherwise noted in parentheses.

Neonatal Respiratory Distress Syndrome

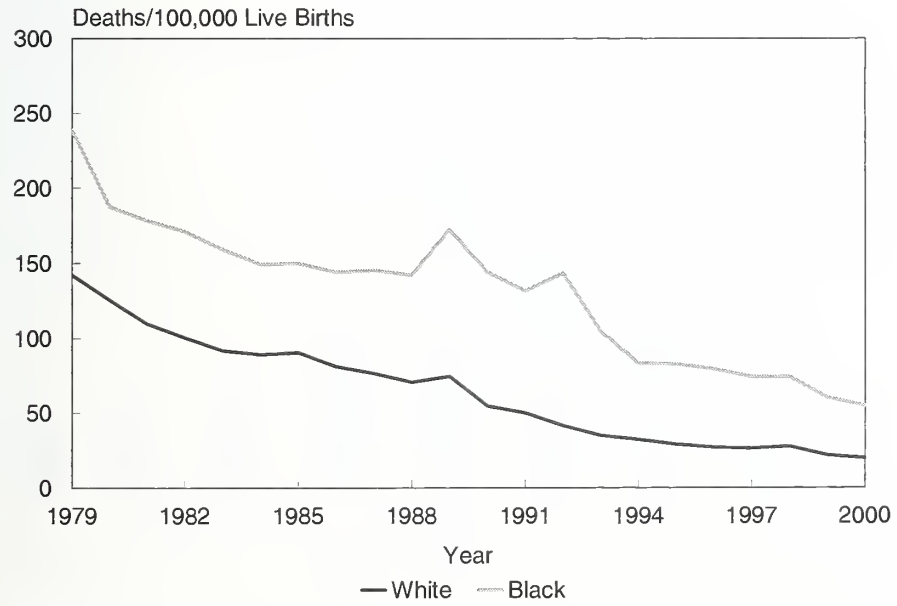
Chart 4–31
Infant Mortality Rate for Respiratory Distress Syndrome, U.S., 1968–2000



Infant mortality for RDS declined steeply from 1974 to 1981, followed by a slower but appreciable decline.[11, 22–24]

* Under age 1.

Chart 4–32
Infant Mortality Rate for Respiratory Distress Syndrome by Race, U.S., 1979–2000



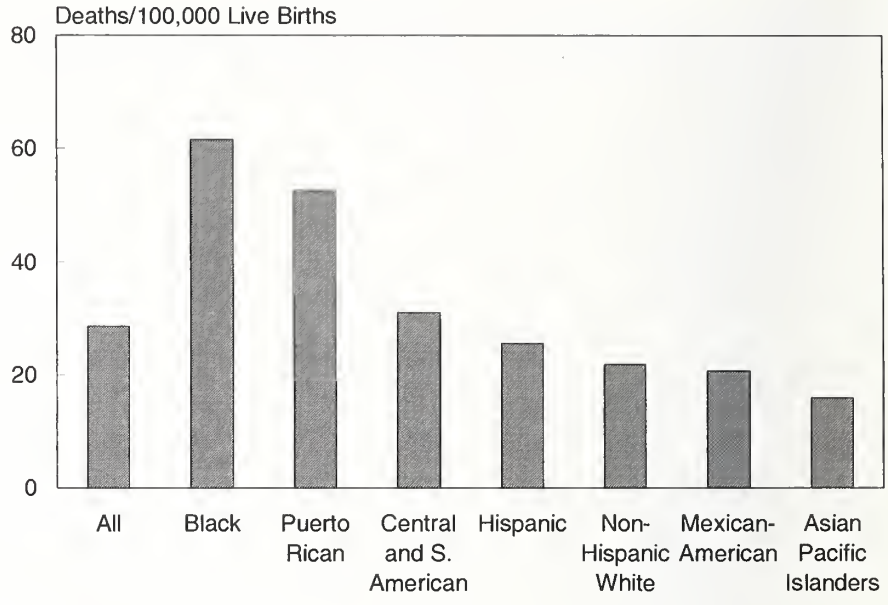
Although the decrease in infant mortality for RDS has been appreciable in both blacks and whites during the past 20 years, a black-white gap still remained in 2000.[11, 22–24]

* Under age 1.

Neonatal Respiratory Distress Syndrome/SIDS

Chart 4–33
Infant Mortality Rate for Neonatal Respiratory Distress Syndrome by Race/Ethnicity, U.S., 1999

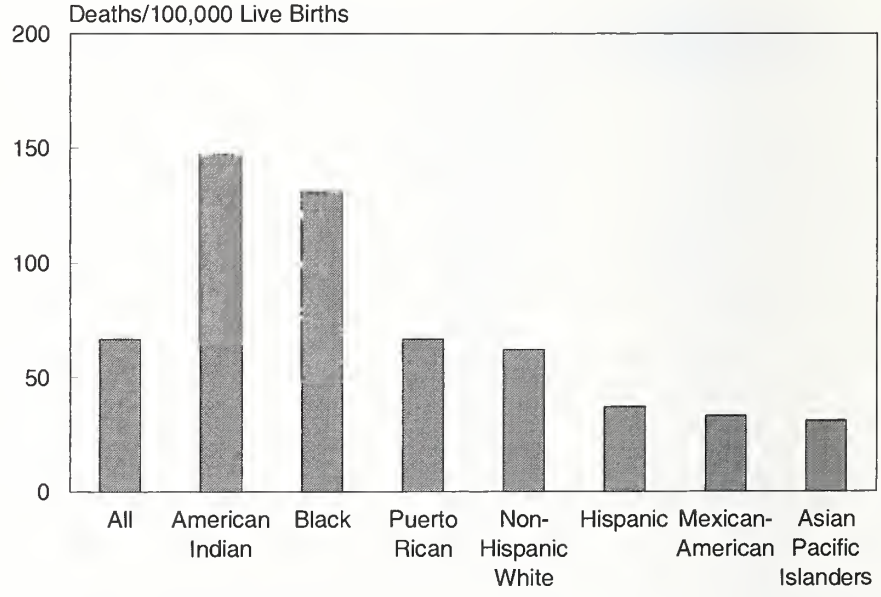
In 1999, infant mortality for neonatal RDS was highest in blacks and Puerto Ricans and lowest in Asian Pacific Islanders.[42]



Note: No data for American Indians.

Chart 4–34
Infant Mortality Rate for Sudden Infant Death Syndrome by Race/Ethnicity Groups, U.S., 1999

In 1999, infant mortality for SIDS was highest in American Indians and blacks and lowest in Asian and Pacific Islanders.[42]



Note: No data for Central and South American.

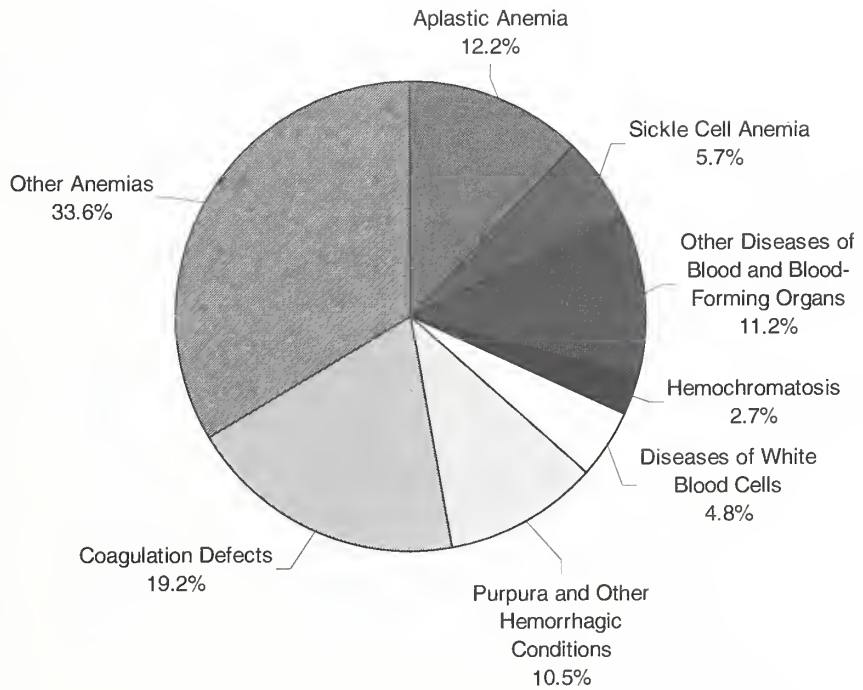
5. Blood Diseases

The term *blood diseases* is used here to mean diseases within the diagnostic categories listed in "Diseases of the Blood and Blood-Forming Organs and Certain Disorders Involving the Immune Mechanism" of the ICD; hemochromatosis is also included in this chapter. Blood-clotting diseases, most of which are subsumed under CVD, have been excluded, as have other blood diseases such as bleeding and red blood disorders of the newborn and serum hepatitis.

Chart 5–1 shows the distribution of deaths in 1999 by blood disease subgroups. Chart 5–2 contains a list of blood diseases; their 9th revision ICD codes; 1999 estimates of hospital discharges, length of stay, and physician office visits for the diagnostic codes; 10th revision ICD codes for the blood diseases; and number of deaths in 1999 for those codes. Subsequent charts display morbidity and mortality for aplastic anemia and sickle cell anemia.

The annual death rates for these diseases are very small and may vary considerably from year to year. By using combined mortality over an 11-year period (1988 through 1998) to obtain average annual death rates rather than statistics for a single year, it is possible to improve data reliability for sex and race comparisons.

Chart 5–1
Blood Disease Deaths,
Percent By Subgroup, U.S., 1999



Total Deaths = 8,733 (100%)

Blood Diseases

Chart 5–2
Number of Hospitalizations, Physician Office Visits, and Deaths for Selected Blood Diseases, U.S., 1999

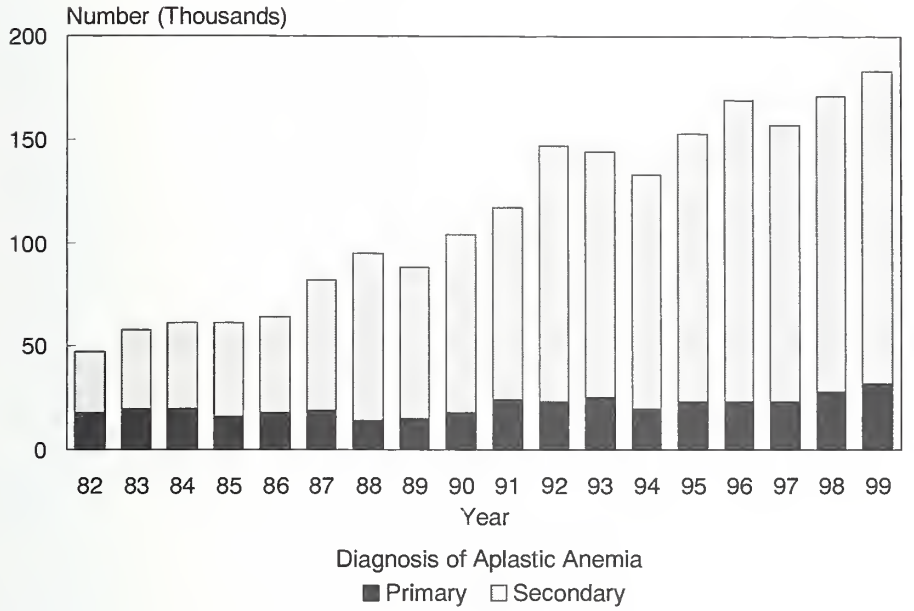
		Hospitalizations				
Diagnostic Category	ICD/9 Codes	First-Listed Discharge (1,000)	Length of Stay (Days)	Physician Office Visits (1,000)	ICD/10 Codes	Deaths
Total	280-289, 275.0	368	4.8	3,365	D50-D89, E83.1	8,733
Anemias: total	280-285	232	4.9	2,233	D50-D64	4,503
Iron deficiency anemia	280	47	4.4	473	D50	118
Other deficiency anemias	281	6	4.5	284	D51-D52	99
Cooley's anemia	282.4	4	2.5	0	D56	20
Sickle cell anemia	282.6	60	5.8	122	D57.0, D57.1	501
Aplastic anemia	284	32	6.8	0	D60-D61	1,069
Other and unspecified anemias	Residual	83	3.9	1,354	Residual	2,696
Coagulation defects	286	18	5.2	19	D65-D68	1,681
Hemophilia: factor VIII	286.0	1	7.5	0	D66	78
Hemophilia: factor IX	286.1	0	1.3	0	D67	3
Other	Residual	17	5.3	19	Residual	1,600
Purpura and other hemorrhagic conditions	287	37	4.5	398	D69	920
Primary thrombocytopenia	287.3	14	5.0	115	D69.3, D69.4	353
Secondary thrombocytopenia	287.4	5	4.8	0	D69.5, D69.6	529
Other	Residual	18	4.1	283	Residual	38
Diseases of white blood cells	288	57	4.9	254	D70-D72	417
Other diseases of blood and blood-forming organs	289	24	4.2	400	D73-D89	974
Hemochromatosis	275.0	0	0	61	E83.1	238

Note: Estimates of hospitalizations and physician office visits are subject to sampling variability. Estimates of hospitalizations below 15,000 have a relative standard error of more than 16 percent. Estimates of physician office visits below a million have a relative standard error of more than 30 percent.

Compiled from references 11, 25, 28, and 32.

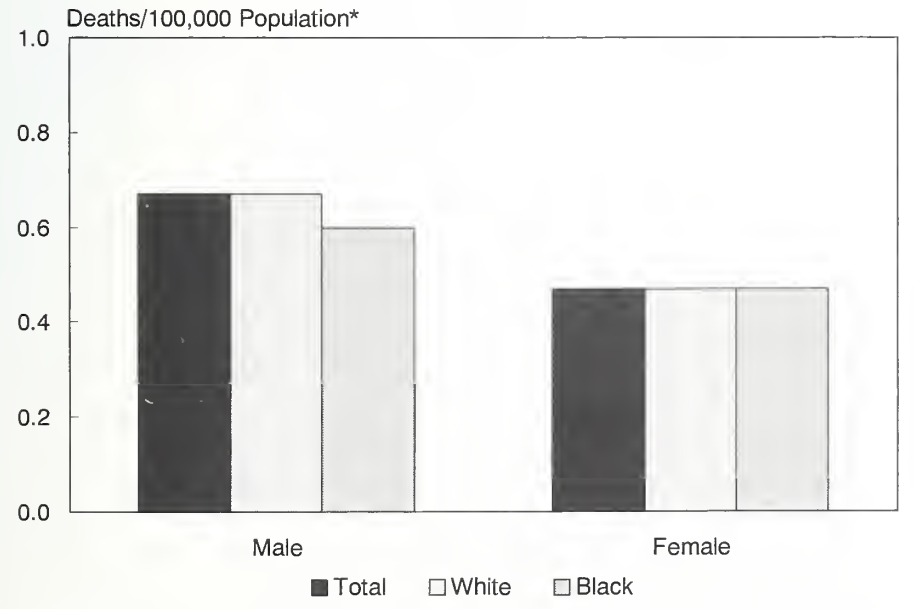
Anemias

Chart 5–3
Hospitalizations for Aplastic Anemia, U.S., 1982–1999



Hospitalizations for aplastic anemia nearly quadrupled by 1999 compared with 1982. The increase was due to aplastic anemia as a secondary diagnosis.[28–29]

Chart 5–4
Age-Adjusted Death Rates for Aplastic Anemia by Race and Sex, U.S., 1988–98



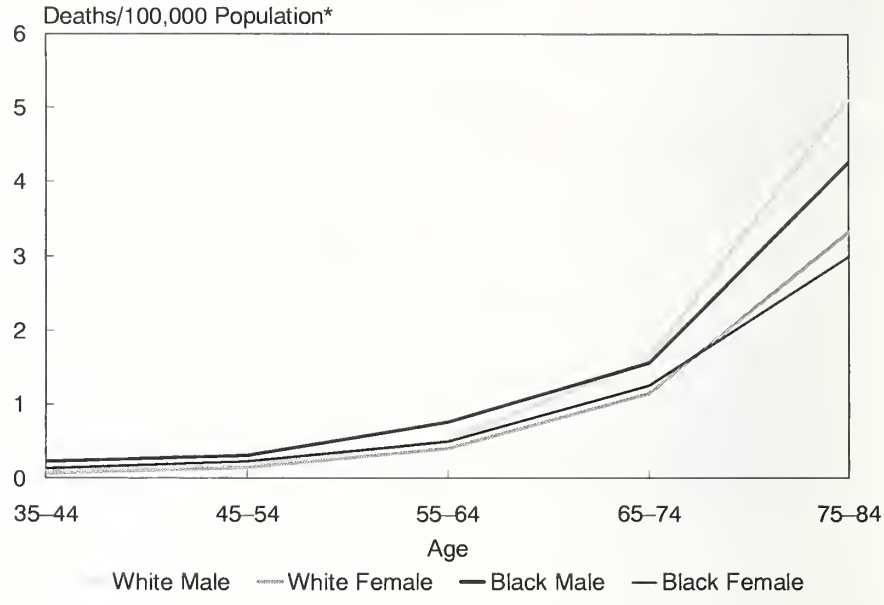
Mortality from aplastic anemia was higher in males than in females. Within sex groups, it was similar for blacks and whites.[11]

* Average annual rates.

Anemias

Chart 5–5
Death Rates for Aplastic Anemia
by Age, Race, and Sex, U.S., 1988–98

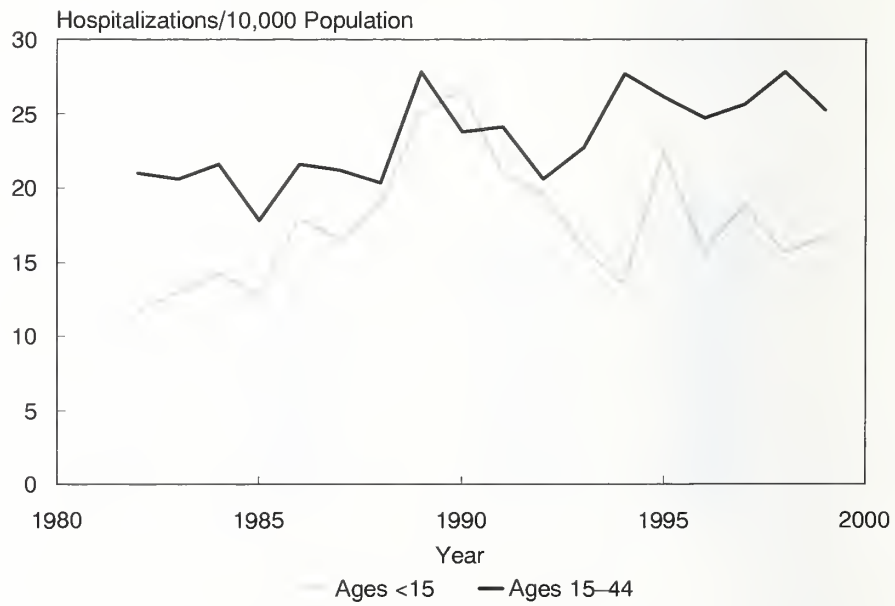
Within race groups for all ages, aplastic anemia death rates were higher in males than in females. At younger ages, within sex groups, they were higher in blacks than in whites.[11]



* Average annual rates.

Chart 5–6
Hospitalization Rates for Sickle Cell Anemia,
Ages <15 and 15–44, U.S., 1982–1999

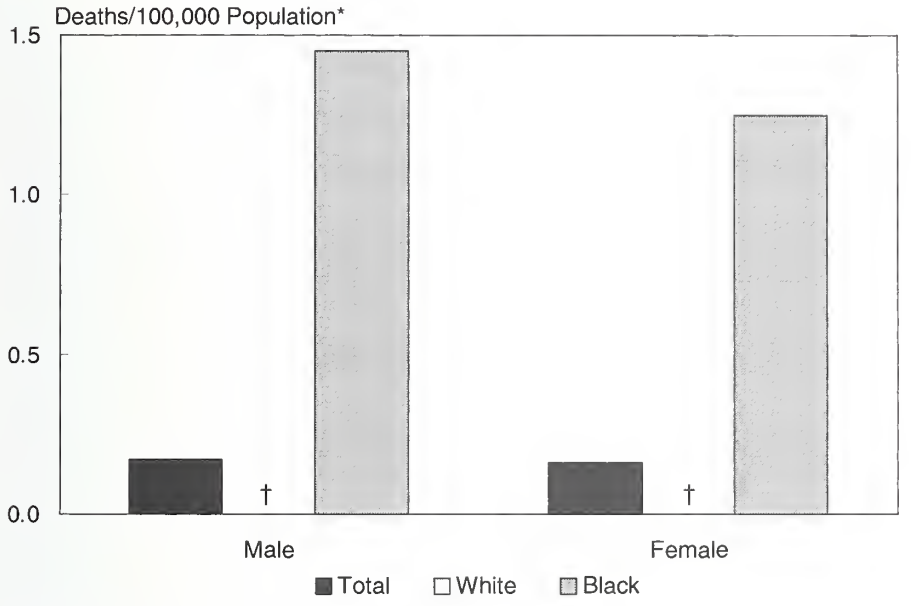
Hospitalization rates for sickle cell anemia varied considerably between 1982 and 1999. Overall, however, they increased for both age groups, with rates in the older age group remaining higher than those in the younger age group.[28–29]



Note: All discharges for this disease are assumed to be in the black population.

Anemias

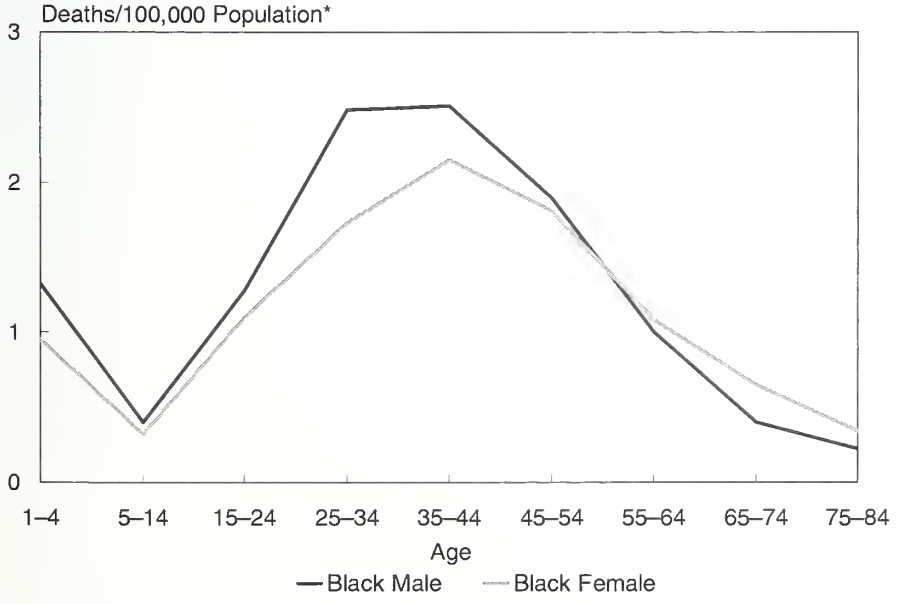
Chart 5–7
Age-Adjusted Death Rates for Sickle Cell Anemia by Race and Sex, U.S., 1988–98



* Average annual rates.
† Rates for white males and females are less than 1/2 of 1 percent.

Mortality from sickle cell anemia occurs predominantly in blacks, with males having a slightly higher death rate than females.[11]

Chart 5–8
Death Rates for Sickle Cell Anemia by Age and Sex in Blacks, U.S., 1988–98



* Average annual rates.

Sickle cell anemia mortality was relatively similar for males and for females. Death rates were especially high for individuals younger than 4 years of age and for those between ages 15 and 64 years.[11]

Appendixes

International Classification of Diseases

Estimated Comparability Ratios

Definition of Terms

Abbreviations

References

Appendix A

International Classification of Diseases: Codes for Selected Diagnostic Categories (6th, 7th, 8th, 9th, and 10th Revisions)

Diagnostic Term in Chartbook	ICD/6 1949–1957	ICD/7 1958–1967	ICDA/8 1968–1978	ICD/9 1979–1998	ICD/10 1999–
Cardiovascular diseases[a]	330–334, 400–468	330–334, 400–468	390–458	390–459	I00–I99
Heart disease	400–402, 410–443	400–402, 410–443	390–398, 402, 404–429	390–398, 402, 404–429	I00–I09, I11, I13, I20–I51
Coronary heart disease[b]	420, 422	420, 422	410–413	410–414, 429.2	I20–I25
Acute myocardial infarction	*	*	410	410	I21, I22
Heart failure[c]	†	†	427.0, 427.1	428	I50
Congestive heart failure	†	†	427.0	428	I50.1
Rheumatic heart disease[d]	400–402, 410–416	400–402, 410–416	390–398	390–398	I00–I09
Cardiomyopathy	†	†	†	425	I42
Cerebrovascular diseases (stroke)[e]	330–334	330–334	430–438	430–438	I60–I69
Diseases of arteries	450–456	450–456	440–448	440–448	I70–I78
Congenital anomalies of the circulatory system[f]	†	†	746–747	745–747	Q20–Q28
Chronic obstructive pulmonary disease[g]	500–502, 527.1	500–502, 527.1	490–492, 519.3	490–492, 494–496	J40–J44
Asthma	241	241	493	493	J45–J46
Neonatal respiratory distress syndrome[h]	†	†	776.1–776.2	769	P22

a The ICD term is diseases of the circulatory system.

b The ICD/6 and ICD/7 term is arteriosclerotic heart disease; the ICDA/8, ICD/9, and ICD/10 term is ischemic heart disease.

c The ICDA/8 terms are congestive heart failure and left ventricular failure. The ICD/9 and ICD/10 term is heart failure (428) or CHF (428.0)

d The ICD/6 and ICD/7 terms are rheumatic fever and chronic rheumatic heart disease. The ICD/9 and ICD/10 terms are active rheumatic fever and chronic rheumatic heart disease.

e The ICD/6 and ICD/7 term is vascular diseases affecting the central nervous system; the ICDA/8, ICD/9, and ICD/10 term is cerebrovascular disease.

f The ICDA/8 terms are congenital anomalies of heart and other congenital anomalies of circulatory system. The ICD/9 terms are bulbus cordis anomalies and anomalies of cardiac septal closure, other congenital anomalies of heart, and other congenital anomalies of circulatory system.

g The ICD/6 and ICD/7 terms are chronic bronchitis, unqualified bronchitis, and emphysema without mention of bronchitis; the ICDA/8 terms are chronic bronchitis, unqualified bronchitis, emphysema, and chronic obstructive lung disease; the ICD/9 and ICD/10 terms are chronic bronchitis, bronchitis not specified as acute or chronic, emphysema, bronchiectasis, extrinsic allergic alveolitis, and chronic airways obstruction not elsewhere classified.

h The ICDA/8 terms are hyaline membrane disease and respiratory distress syndrome. The ICD/9 term is respiratory distress syndrome. The ICD/10 is respiratory distress of newborns.

* No code for this category exists in this ICD revision.

† No data for this category are presented in the *Chart Book* in this period.

Appendix B

Estimated Comparability Ratios for Selected Causes of Death, U.S.

Cause of Death	Codes of the International Classification of Diseases ICD/10	ICD/9	Numbers of Deaths* ICD/10	ICD/9	Comparability Ratio†
Malignant neoplasms	C00–C97	140–208	464,688	461,544	1.0068
Major cardiovascular diseases	I00–I78	390–434, 436–448	796,919	798,435	0.9981
Diseases of the heart	I00–I09, I11,I13, I20–I51	390–398, 402, 404, 410–429	615,564	624,405	0.9858
Coronary heart disease	I20–I25	410–414, 429.2	466,459	466,935	0.9990
Heart failure	I50	428	44,297	42,554	1.0410
CVD (stroke)	I60–I69	430–434, 436–438	137,264	129,640	1.0588
Diseases of arteries	I70–I78	440–448	32,133	33,706	0.9533
Influenza and pneumonia	J10–J18	480–487	50,526	72,371	0.6982
Chronic lower respiratory disease	J40–J47	490–494, 496	94,326	90,022	1.0478
COPD	J40–J44	490–492, 494, 496	90,109	85,304	1.0563
Asthma	J45–J46	493	4,217	4,718	0.8938
Neonatal RDS	P22	769	917	894	1.0257
SIDS	R95	798.0	2,575	2,485	1.0362

* From a sample of deaths in 1996.[4]

† Deaths coded to ICD/10 divided by deaths coded to ICD/9.

Appendix C

Definition of Terms

Age-adjusted death rate:	An age-adjusted rate is a summary rate for a given age range and is computed by multiplying the age-specific rates for a given diagnosis (or cause of death) by the standard population for the age range and summing those products. The standard population is the U.S. population in 2000 as it is distributed proportionately in 10-year age groups.[5–7, 27]
Chronic condition:	A condition is considered chronic if (1) the respondent (in a health interview) indicates it was first noticed more than 3 months before the initial date of the interview, or (2) it is a type of condition that ordinarily has a duration of more than 3 months.[15]
Comparability ratio:	A comparability ratio is the number of deaths from a cause as coded by an ICD revision divided by the number of deaths from the closest similar cause as coded by the preceding ICD revision. A sample of death certificates from a chosen year is used for the calculation. The ratios measure discontinuities in mortality trends resulting from the introduction of a new ICD revision.[4]
Hospitalization:	Hospitalization refers to hospital discharge, the formal release of a hospital inpatient. It may be the result of death or transfer to a place of residence, nursing home, or another hospital. First-listed diagnosis is the coded diagnosis identified as the primary diagnosis or the diagnosis first listed on the face sheet of the hospital medical record. Hospital refers to non-Federal, short-stay (average length of patient's stay is less than 30 days), general (e.g., medical or surgical) or children's general hospitals, with six or more beds for inpatient use.[27]
Incidence:	Incidence is the number of cases that had their onset during a specified period of time, usually a year.[27]
Infant mortality rate:	Infant mortality is the number of deaths occurring in infants younger than 1 year of age from a cause (or all causes) divided by the number of live births occurring the same year, and then expressed as the rate per 100,000 live births for that year.[27]
Limited in activity:	Also called chronic activity limitation, it refers to the limitation of a person's usual activity due to a chronic condition.[27]
Morbidity:	Morbidity refers to incidence, prevalence, hospitalizations, and physician office visits.

Appendix C

Definition of Terms (continued)

Prevalence:	The prevalence of a condition is the number of persons who have the condition at a given time.[27]
Relative standard error:	The standard error is primarily a measure of sampling error—not measurement error—that is, the variation that might occur by chance because only a sample of the population is surveyed. The relative standard error of an estimate is obtained by dividing the standard error of the estimate by the estimate itself.[27]
Underlying cause of death:	The underlying cause of death is the disease or injury that initiated the events leading directly to death. It is selected from the conditions entered in the cause-of-death section of the death certificate. When more than one cause or condition is entered by the physician, the underlying cause is determined by the sequence of conditions on the certificate, provisions of the ICD, and associated classification rules.[27]

Appendix D

Abbreviations*

AMI	acute myocardial infarction
CHD	coronary heart disease
CHF	congestive heart failure
CMS	Centers for Medicare & Medicaid Services
COPD	chronic obstructive pulmonary disease
CVD	cardiovascular diseases
ICD	International Classification of Diseases
ICDA	International Classification of Diseases, Adapted for Use in the United States
NCHS	National Center for Health Statistics
NHANES	National Health and Nutrition Examination Survey
NHIS	National Health Interview Survey
NHLBI	National Heart, Lung, and Blood Institute
RDS	respiratory distress syndrome
SIDS	sudden infant death syndrome
WHO	World Health Organization

* Country abbreviations may be found on the following page.

Appendix D

Abbreviations (continued)

AUL	Australia
CZR	Czech Republic
DEN	Denmark
FIN	Finland
GER	Germany
HUN	Hungary
JPN	Japan
KOR	Republic of Korea
NOR	Norway
NTH	Netherlands
POL	Poland
ROM	Romania
SCO	Scotland
SWE	Sweden
USA	United States of America

Appendix E

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